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nt to the Final Environmental Statement

VOLUME 2 OF 2

Proposed Five-Year OCS Oil & Gas Lease Sale Schedule

January 1982 - December 1986

Prepared by The Bureau of Land Management
United States Department of the Interior

NOTE TO READERS

The purpose of this Final Supplemental Environmental Impact Statement is to revise the Draft of this document which was released to the public on June 10, 1981, and has since received the benefit of testimony from several public hearings, and written comments from other Federal agencies, States and local governments, and private organizations and individuals. Meanwhile, the Department of the Interior has progressed in refining the program covered by Draft.

This document describes the latest (July 1981) proposed five-year oil and gas leasing schedule for the OCS, comparing it to the April 1981 draft proposed schedule and seven other alternatives. Like the Draft, this document will describe the impacts estimated to result from the adoption of each of these schedules, comparing them to those discussed in the Final Environmental Impact Statement (FES 80-3) Five-Year OCS Oil and Gas Lease Sale Schedule, March 1980 - February 1985.

This document references, by page number, corresponding sections in FES 80-3, the FEIS, in order to ease cross-referencing between the two documents. Only sections which have been substantially altered, or sections which describe and analyze new impacts are reproduced here. It is important with this document, as it was with the Draft Supplement, that the reader refer to, or be familiar with, material found in the Final Five-Year OCS Leasing Schedule Environmental Impact Statement. This document is not a substitute for the FEIS; rather it only supplements the original analysis, and adds additional alternatives for analysis and consideration.

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UNITED STATES DEPARTMENT OF THE INTERIOR

FINAL SUPPLEMENT TO THE FINAL ENVIRONMENTAL STATEMENT

Proposed Five-Year OCS Oil and Gas Lease Sale Schedule

January 1982 - December 1986

Volume 2 of 2

Director, Bureau of Land Management

10. Kodiak

a. Alternative I-1

1) General Impacts

a) Coastal Ecosystems: The Kodiak Island planning area encompasses significant concentrations of nesting and feeding birds and marine mammals such as sea otters, seals, and sea lions. These significant concentrations occur in the following areas: the coastal areas of Afoganak Island; Ugak Bayl; Marot Bayl; Chiniak Bay; Aliulik Peninsula; and Sitkalidak; Tugidak, and Sitkinak Islands. These populations could be adversely impacted from oil contamination of marine waters and contamination of food organisms around these sites. Additional, these areas plus Kiliuda Bay are important nearshore habitats for important commercial fish and shellfish. Impacts to these resources are discussed in Section V.D.10.a.2.a), b), and c).

The primary concern in these coastal ecosystems is the relatively high retention potential for spilled oil. Should oil contact these areas, it may persist for up to ten years.

Kiliuda Bay has been identified as the site of an onshore facility. Kiliuda Bay contains 13 km of coastline on which spilled oil might become buried and persist for over a year, and 5 km on which it is expected to persist for up to 10 years. There are several similar sections of coastline in Sitkalikak Straits to the southwest--the direction in which a slick might easily drift from Kiliuda Bay. Any hydrocarbons spilled near these protected aeras will probably persist in sections of the shoreline for many years. The importance of these factors rests in persistence time rather than areal extent.

The effects of oil on both attached and pelagic littoral organisms have been studied along many coasts. Littoral plants, which were killed by oilspills in Massachusetts and Texas, had not recovered after three years (Hampson and Maul, 1977; Holt, et al., 1978). The Massachusetts spill also caused almost a total kill of small infauna organisms (Sanders, et al., 1972). Larger organisms in the littoral zone, such as razor clams, may be killed, as they were after the Amoco Cadiz oilspill. Inshore concentrations of the juvenile stages of commercially important bottomfish, such as halibut, flounder, crab, and scallops, may develop abnormally (Kuhnolhd, et al., 1978). Juvenile stages of crabs, shrimp, and salmon, which concentrate in nearshore waters, were killed within four days by dilute concentrations of Cook Inlet and Prudhoe Bay crude (Karinen and Rice, 1974; Rice, et al., 1975; Brodersen, et al., 1977).

A disruption of trophic dynamics (food chain) of these areas may ultimately lead to long-term declines in higher vertebrates (fish, birds and mammals). Given that a small number of oilspills (0.6 for spills greater than 1,000 barrels and 0.2 for spills greater than 10,000 barrels) are expected over the life of the proposal, and the relatively sheltered nature of some of these bays, it is unlikely that more than one of these habitats would be affected. The level of expected impacts then is low.

Conclusion. The coastal ecosystems of the Kodiak planning area are expected to suffer low ecological losses as a result of the proposal.

Cumulative Impacts. If all areas of the Kodiak planning area are leased and all resources subsequently are developed over the life of the proposal, the expected number of oilspills is about 3.9 spills greater than 1,000 barrels and about 1.7 spills greater than 10,000 barrels. An additional unknown quanity of oilspills are expected to result from tankering from Federal OCS lease sales in the Cook Inlet planning area, as well as from also State of Alaska leases in the territorial waters of Cook Inlet. These total projects or activities could effect the coastal ecosystems by increasing the risk of oilspills. The cumulative impacts of these oilspill events, projects and activities are expected to produce a moderate impact to intertidal habitats in the Kodiak planning areas.

In relation to the case of all resources in the planning area leased and developed, the alternative contributes about 15 percent of spills greater than 1,000 barrels and about 12 percent of spills greater than 10,000 barrels. These proportions are slightly less when the tankering from other Federal OCS planning areas and State lease sale areas (to an unknown extent) is considered. The most important causal agent for potential cumulative impacts on the coastal ecosystems is the proposal itself.

The contribution of the alternative to cumulative impacts is minor when all total development of resources in the planning area is considered within the cumulative impacts do not include total development.

b) Water Quality and Supply

Water Quality: Onshore water quality impacts would be similar to those for the Gulf of Alaska planning area for the proposed action.

Offshore water quality over most of the planning unit is very good. On Kodiak, however, the waterfront area is subjected to seafood processing waste and sewage inputs from industrial and municipal sources. The accumulated waste locally depresses oxygen concentrations and produces sludge mats. Water quality elsewhere offshore could be impacted by discharge of drilling muds, drill cuttings, formation waters, and accidental discharge of oil. If expected quantities of oil and gas are found and developed, 165 million barrels of formation waters would be produced over the life of the fields. Only 0.6 oilspills of 1,000 barrels or more and 0.2 oilspills of 10,000 barrels or greater would be expected over the life of the fields. During the years of exploratory and developmental drilling 6600 cubic yards of drill cuttings and 13,200 barrels of drilling mud would be discharged into Kodiak waters. The discharge of mud and cuttings would increase turbidity around drilling sites, affecting 0.02 percent of the Kodiak planning area. Discharge rather than reinjection of formation waters could release barrels of oil to the sea over the production life of the fields. In the absence of a major oilspill (which is unlikely), offshore petroleum development would result in slight chronic oiling of and loss of clarity in waters near permanent structures.

Water Supply: Potable water is in short supply in the Kodiak City area and supplies would need to be developed. This would result in very high impacts to water supply. This would occur whether enclave development occured in Monashka Bay or near Talnik Point or whether development occured in Kodiak City.

Conclusion. The effects on water quality from OCS activity in this area will be low, except possibly in the immediate vicinity of platforms. Existing water systems could not handle large-rate OCS development, so new water supplies would have to be developed. Impacts on water supply is expected to be very high.

Cumulative Impacts. If all potential oil and gas resources of the Kodiak planning area are leased and subsequently developed in a timely manner, the expected number oilspills is 3.9 spills of 1,000 barrels or more with 1.7 spills of at least 10,000 barrels. No additional oilspills are expected to result from tankering from Federal OCS lease sales in other planning areas. An additional unknown number of oilspills could occur from development of State of Alaska onshore and offshore reserves in Cook Inlet (sales 35, 40, 49). Oil industry development of all gas and oil reserves in the Cook Inlet planning area would result in discharge of 42,000 cubic yards of drill cutting and 84,000 barrels of drilling mud per year during drilling phases. Formation waters produced would total 850 million barrels over the life of the field. Additional projects or activities that could contribute to cumulative impacts in the planning area are coal mining and export, increased commercial traffic, offshore gold dredging, and upgrading of fish processing facilities . These projects and activities could affect water quality in the following ways. Sewage, fish waste, and suspended sediment inputs from these projects and activities could locally degrade water quality by increasing turbidity, decreasing oxygen levels, and stimulating algal and bacterial growth. There would also be additional risk of fuel spills. The cumulative impacts of these oilspill events, discharges, and additional traffic are expected to produce a low impact to water quality in the planning area.

In relation to the case of all resources in the planning area leased and developed, this alternative contributes 15 percent of spills of 1,000 barrels or more and 12 percent of spills of at least 10,000 barrels. This alternative would provide 20 percent of cumulative impact to the planning area from drill cuttings, 57 percent of the impact from drilling mud, and 32 percent of the impact from formation waters. The greatest threat to water quality is from oil pollution.

The percentage of cumulative impact from oil pollution due to development within the planning area portion of the alternative is reduced slightly when tankering from existing and proposed state leases are considered. This alternative contributes very slightly to the total cumulative planning area case. The most important causal agent for potential cumulative impact on water quality is oil pollution from cumulative Federal OCS leasing in the planning area. The contribution of this alternative to cumulative impacts is insignificant whether or not total development of OCS hydrocarbon resources in the planning area is considered part of the cumulative case.

Cumulative Impacts. If all potential oil and gas resources of the Kodiak planning area were leased and developed, new water supply facilities would be required, causing high impact. Other cumulative impacts are expected from further development of the bottomfishing industry, a general increase in commercial activity and population, and from Federal OCS Sale 60; the sum effect of these additional impacts is also likely to be high. Some of this impact will be mitigated following the current construction of a new hydroelectric facility near the city of Kodiak. It is unlikely that the proposed

action in this planning unit under this alternative would constitute a major portion of total water supply needs.

c) Navigation: Navigational use of the waters comprising the Kodiak planning unit are limited almost entirely to fishing vessels. Although resource estimates specific to the planning unit are not available they are believed to be low. Assuming that, like the Gulf of Alaska, one platform is emplaced as a result of the sale, it is improbable that any impacts to navigation will occur. Activities due to both exploratory and developmental activities will be such a level as to not hinder the normal flow of vessel activity.

Conclusion. Impacts to navigation will be very low.

Cumulative Impacts. Principal contributors of potential impacts to navigation systems, within the Kodiak planning area would be tankering from the Hope, Norton, Navarin, St. George, North Aleutian, Shumagin, and Cook Inlet planning areas as well as vessel movements from Kodiak's very large fishing fleet. Currently, on Kodiak Island, a hydroelectric project is being constructed as well as two small boat harbors. These latter three projects may alleviate potential conflicts for vessel and harbor space by providing power for additional facilities and by removing some competitive pressure for harborage.

Considering the rather limited scope of the proposal in regard to this planning area (i.e., low resources and a small number of platforms), it is probable that its overall impact to navigation will be very low. Considering both the cumulative and mean case resources, total traffic added by the proposal to the current and estimated traffic volumes of the ara would probably be less than one percent. Navigation systems impacts are expected to be very low.

d) Other Uses of the OCS: Other uses in the Kodiak area are mainly fishing activities, with some recreation. The area is used for marine transport. See Commercial Fishing, below.

e) Land Use: The City of Kodiak, because it is the only large-scale infrastructure adjacent to the lease area (beside the Coast Guard facility at Women's Bay), would get some of the impact from OCS activities, although very little land is available there. Development is assumed to be of the enclave type, which will almost eliminate local land use impacts and competition for goods and services. The enclave would include the support/supply base, a medium-size crude oil terminal, and docking facilities and require approximately 150 acres. an LNG plant. There will be land use impacts wherever the enclave is located, because most of the land on Kodiak and Afognak Islands is undeveloped. Potential locations could be Monashka Bay or Talnik Point near Port Lions.

Conclusion: Impacts on land use will be low, as most of the area is undeveloped and could easily accommodate additional land development. Land use patterns in Kodiak will be moderately affected if production facilities were to be located there, which would require additional infrastructure development.

Cumulative Impacts. Other projects that will affect land use in the Kodiak Island area are the Terror Lake hydroelectric project, the proposed development of small boat harbors at Port Lions and Kodiak City, the

implementation of the Kodiak Island Borough's coastal zone management program, and the ever increasing fishing industry. Kodiak's population is expected to remain centered in the City of Kodiak while development around the island will become limited to specified enclaves. Power from the hydroelectric project will facilitate growth in and around the city while the growth of the fishing industry will continue to increase the city's industrialization and demand for space. OCS development would result in major changes in land use. Impacts which may occur to land use patterns would increase in proportion to the proximity of the required facilities to the City of Kodiak. Location of these facilities elsewhere on the relatively unpopulated island would have little real impact on land use.

For the total development of OCS resources in the planning area, land use impacts would affect 450 acres of land because of the need for a large oil and/or gas processing facility, living quarters for operations and construction personnel, warehouses, dock facilities, and a material support facility. The maximum resource development would result in major changes in land use. Impacts to land use patterns caused by OCS activities will decrease in proportion to their distance from Kodiak City. Location of these facilities away from an established community will have an insignificant impact on land use patterns.

The proposal does not contribute significantly to land use in impacts in the planning area whether or not the total development of hydrocarbons over the life of the proposal is considered as part of the cumulative impacts.

f) Cultural Resources: The following known and registered sites could be impacted by increased population:

Holy Resurrection in Kodiak
Site KOD 207 on Long Island
Three Saints Bay Site
Fort Abercrombie
Urskine House
State series of Russian Orthodox Churches
New Valaam Spruce Island
Karluk 37 at Karluk (eligible)

Since the resident population associated with the proposal is low, the impact to cultural resources will be minimal. Also, coastal cultural resources will not be severely affected by oil spills associated with the development of hydrocarbon resources in the area.

Conclusion. Impacts on offshore cultural resources would likely be low, as the likelihood is small that any would be encountered by oil and gas development. Impacts to known onshore sites is expected to be low as enclaves will occupy relatively little land.

Cumulative Impacts. If all potential oil and gas resources of the Kodiak planning area are leased and all resources subsequently are developed over the life of the field, the expected number oilspills is 3.9 spills greater than 1,000 barrels and 1.7 spills greater than 10,000 barrels. An additional unknown quantity of oilspills is expected to result from tankering from Federal OCS lease sale in the North Aleutian, St. George Basin, Navarin, St.

Matthew-Hall, Hope and Barrow Arch planning areas. An additional unknown number of oil spills could occur from development of State of Alaska territorial waters in Cook Inlet, Bristol Bay, Hope and Norton. Additional projects of activities could contribute to cumulative impacts in the planning area are bottom fishing, hydroelectric projects and boat harbors in Kodiak and Port Lions. These total projects or activities could affect cultural resources with population impacts, looting and oiling of artifacts, The cumulative impacts of these oil spill events, projects and activities are expected to produce a moderate impact to cultural resources in the Kodiak planning area.

In the case of all resources in the planning area leased and developed, the alternative contributes 15 percent of spills greater that 1,000 barrels and 12 percent of spills greater than 10,000 barrels. These proportions pale considerably beside potential spills from tankering from other Federal OCS planning areas and State lease sale areas (to an unknown extent) through the planning area. The most important causal agents for potential cumulative impacts on cultural resources is population impact. The contribution of the alternative to cumulative impacts is minor whether or not total development of the resources in the area is considered within cumulative.

2) Impacts of Special Concern

a) Fisheries

1) Important Fish Resources: The important commercial fishery resources of the Kodiak planning area include all five species of Pacific salmon (primarily pink salmon); king, Tanner and dungeness crab, shrimp, scallops, Pacific herring, halibut and several species or groups of bottomfish (ocean perch, blackcod, walleye pollock, Pacific cod, sole, and flounder). Subsistence fisheries tend to rely more heavily of salmon, and to a lesser degree on crab and other shellfish. Impacts to these resources would result from accidental oilspills and discharge of drilling effluents and wastes.

Over the life of the proposal, 0.6 oilspills greater than 1,000 barrels and 0.2 oilspills greater than 10,000 barrels are expected to result from Alternative I-1. South Alaska sales. For the sake of this analysis all the South Alaska sales resource estimates and resultant development are assumed to occur in the Kodiak planning area. Oilspills can impact fish populations by causing short-term acute impacts or long-term sublethal impacts. Since most oil remains at or near the surface, species that are most vulnerable are those that inhabit the surface layer or shallow nearshore at least some time during their life cycle. These species include salmon (adult and juvenile of all five species, and egg and larvae of pink and chum salmon), herring (all life stages), crab (larvae of all species), shrimp (adult), and several species of demersal fish (eggs and larvae).

Salmon: Adult salmon (of all five species) would be vulnerable to oil contamination if a spill contacted areas in or near the mouths of rivers during or preceeding periods when these fish are congregating near these river mouths prior to migrating up river to spawn. Smolt would be susceptable to adverse impacts in the same areas during out-migration or in nearshore areas during their first few months in the marine environment. Pink and chum salmon would be vulnerable during all life stages as these species spawn intertidally to

some degree. Vulnerability to any of the five species would vary depending on the timing of the spawning or out-migration of a particular population or run. The five adult species of salmon in the planning area exhibit a period of vulnerability (spawning period) of approximately three to four weeks. This period of vulnerability occurs from May to September. Little is known about the movements of juvenile salmon. They make coastside movements (lateral to shore), feed and grow in the intertidal, and move offshore over a period of months.

If it is assumed that an oilspill contacts a nearshore area, especially off the mouth of a salmon stream, several impacts could occur. These impacts could be any of a variety of lethal or sublethal toxic responses, or the loss of fish prey organisms. Adult salmon are highly mobile, and some evidence suggests that this life stage could detect and avoid toxic levels of aromatic hydrocarbons in solution (Weber et. al., 1981). Therefore, the major concern seems to be that these adults would avoid areas of contamination, which if found off the mouths of major spawning rivers could result in delays in spawning runs or actual blockage of the river or stream. Given the fact that oilspills in the marine environment generally result in concentrations less than those which have proven toxic to adult salmon (Malins, 1977), it is quite unlikely that this type of impact would occur. Even if toxic concentrations did occur, these concentrations would not remain long in marine waters, especially off the mouth of major rivers where dilution would occur rapidly.

Salmon smolt on the other hand would perhaps be more vulnerable, in that they would remain in nearshore waters for longer periods while they feed and grow in preparation of movements farther offshore. However, like adult salmon, juveniles appear to possess the ability to detect toxic concentrations of petroleum hydrocarbons (Maynard et al., 1981). If this is the case, then oilspills in the nearshore could possibly be avoided to some degree by this life stage. Additionally, as stated above, toxic concentrations in the range of concern (5-15 parts per million [Maynard et al., 1981] of aromatic hydrocarbons) would not be expected in marine waters. However, considering that a spill could remain several days or several weeks in coastal waters, portions of a population may be subject to prolonged stress from sublethal effects.

The eggs and larvae of pink and chum salmon that occur in marine intertidal areas would be the most vulnerable of these earlier life stages. It would be difficult to quantify the impacts to a local salmon fishery from oilspill contamination in a spawning or larval rearing area. However, it is possible that a large portion of eggs and larvae could be lost. The gravity of this loss, however, becomes somewhat obscure when one considers that natural mortality of eggs and larvae may be as high as 75 percent for each of these life stages. The difficulty would be in ascertaining what percentage of those lost from oil pollution would have succumbed naturally. It is possible that most of a year class from a local population could be lost. When considering the large annual fluctuations in these species, however, this may not always be significant. Generally though, a year class lost is not a desirable effect as it can significantly reduce later year populations levels.

Given the extremely low number of expected spills, and the narrow periods of vulnerability at least for adult and juvenile salmon, it is unlikely that an oilspill would contact important nearshore areas during the period when salmon

are present. The level of impact to a local pink or chum population could be high as a result of oil contacting an important spawning and larval rearing intertidal area. Areas of importance in this discussion of pink and chum salmon are the bays along the southeast coast of Kodiak Island.

Shellfish: All three species of crab (Tanner, dungeness, and king) have similar life histories in that adults spend the winter months in deep water (150-400 m) and migrate to shallow (6-20 m) waters in the spring and summer to spawn. During this period, the eggs which have been carried by the female since the previous spawning period hatch and become free swimming planktonic larvae.

Distribution of these most sensitive larval forms is generally widespread, and therefore, would be the most susceptible to contact by an oilspill. The likelihood of such an interaction then is high at least once during the life of the field. Even in the case of a very large spill (10,000 barrels or greater) in the Kodiak region, only a small percentage of crab larvae would be contacted by concentrations of oil (1-10 ppm) that would cause mortality. The level of impact on crab larvae is then expected to be low for regional populations.

Another effect on crab populations may result from oil sinking to the bottom and contacting aggregations of adult or juvenile crab or by contaminating large areas and affecting their food supply. There is greater opportunity for these phenomena in shallower, nearshore waters where adult and juvenile dungeness crab spend lengthy periods. The likelihood of such an event is somewhat less than contact to the larval stages, however. Given the broad distribution of crab populations, it is likely that, with adult and juvenile crab less vulnerable than larval stages, the level of impact to these life stages on a regional basis is low. Local dungeness crab populations in nearshore waters could, however, suffer at least one short-term decline if their habitat is affected.

Scallops would be more sensitive to oil sinking and becoming entrained in the sediments in which the live. This species would be especially vulnerable in the shallow water along the entire southeastern side of Kodiak Island. These organisms can accumulate certain hydrocarbons very rapidly and tend to retain these compounds for longer periods even after being placed in a clean environment (Malins, 1977), leaving them susceptible to lethal and a variety of sublethal effects. While it is likely that a portion of scallop habitat will be affected the level of impact to the regional population would be low.

Shrimp: Five species of pandalid shrimp (pink, humpy, coonstripe, and spot) exist in the waters of the Kodiak planning area. Pink shrimp, however, predominate in the catch. All species are known to inhabit the continental shelf of this region out to depths of around 200 meters. Mating occurs in September in coastal shallows with the eggs carried offshore by the females until they hatch the following March and April. Young shrimp are found in the shallow bays and move into deeper water as they grow. This shallow water period is the period of greatest vulnerability for large numbers of both young and adult shrimp to be contacted by an oilspill. Areas of concern include the bays along southeast side of Afognak and Kodiak Islands, especially Ugak, Marmot, and Kiliuda Bays and around Two-Headed Isle. Given that these areas are somewhat sheltered, it would seem unlikely that the one expected spill would contact any particular bay. At most, one spill would affect a local

population once during the life of the proposal. Therefore, the level of impact on shrimp is expected to be low.

Herring: Herring are most vulnerable from oilspills as spawning adults, eggs, and larvae, in that these life stages occur almost exclusivly in nearshore waters. In May and June herring of this region move into the nearshore areas of bays on the south east side of Kodiak Islands to deposit their eggs on vegetation (kelp and eelgrass) or rocky substrate. Eggs hatch within a month and larvae spend about two months in nearshore waters prior to changing into juveniles and moving offshore.

Because of the low number of expected spills and the fact that these spawning areas are relatively sheltered bays, it is very unlikely that herring would be contracted by an oilspill under this alternative.

If an oilspill did contact one of the spawning areas during the spawning or larval rearing period, it is possible that adverse consequences to the local herring population could occur. These consequences could include egg or larval mortalities, contamination of spawning substrate, loss of organisms upon which larval herring feed, and adult mortalities. It is possible that a year class from the impacted area could be lost as a result of this impact. The extent of these losses would depend on many factors, with the size of spill and size of the affected area being the greatest determinants. It is also possible that only a portion of the spawning population, eggs, or larval herring would be affected in a given area. Given that extreme environmental conditions (i.e., shortage of food supply, storms, etc.) cause extremely high egg and larval mortality (as high as 99 percent for larvae and 60 to 90 percent for eggs (Smith, 1976)), the loss attributable to an oilspill could be extremely small. Even in the worst case, however, the loss of a local year class would not represent a significant regional impact to the total herring biomass.

Demersal Fish: Demersal species including halibut would probably be less affected by an oilspill than any other species group. The most vulnerable species are those which have egg or larval forms that inhabit surface or nearshore surface waters. Important species in the Kodiak planning area which display this characteristic are halibut, ocean perch, sole, flounder, and pollock. Because fish eggs and larvae are relatively sensitive to hydrocarbon contact, and because of the broad distribution of these life stages in the shelf area along the southeast side of Kodiak Island it is likely that the one oilspill would result in a low ecological loss to these species. The level of impact on a regional basis would be low.

Several types of discharges and effluents could be released during OCS oil and gas activities. OCS Operating Orders prohibit disposal of any waste materials into the ocean that will create conditions which will adversely affect aquatic life. Disposal of waste materials is regulated by the Environmental Protection Agency. Of concern are drilling muds because very little is known about their long-term, chronic impacts. There are indications that these muds could produce elevated trace metal concentrations in marine organisms and interfere with reproductive processes. However, given that only 7 exploratory and 26 production wells are projected for this alternative, a relatively small amount of effluent material would be discharged, (Section V.D.10. a.1.b.) and a small demersal area would be affected. Therefore, impacts to fish and shellfish are expected to be very low.

Conclusion: Fish and shellfish that occupy surface and nearshore waters at least some portion of their life history are expected to suffer low ecological losses. Local impacts to pink and chum salmon, all species of crab, and herring could be high but would recover rapidly. Overall, regional impacts to fish and shellfish would be low.

Cummulative Impacts: If all tracts in the Kodiak are leased and developed during the life of the proposal, the expected number of oilspills is about 3.9 for spills greater than 1,000 barrels and about 1.7 for spills greater than 10,000 barrels. Given this small increase in the number of expected spills, the cumulative impacts due to oilspills from development in the planning area to the fish resources of this planning area would still be low. Additional oilspills may occur from tankering crude from other planning areas (and the Canadian Beaufort) through the Kodiak. No precise numbers are forcast. Still, impacts to fish are expected to be low.

Fish populations are also stressed by commercial fishing pressure which combined with the cumulative oilspill impact could result in a high ecological loss to certain species (primarily pink salmon and herring) unless management action (i.e., area closures) is taken to relieve the harvest pressure. Overall, the expected regional impacts is low.

The contribution of this alternative to the cumulative impacts is insignificant. The contribution of this alternative when only the resources described in the alternative are leased (as opposed to total development of OCS resources) is also insignificant.

2) Commercial Fisheries: The Kodiak planning areas comprises one of the most valuable commercial fishing areas in Alaska. In 1979, over 119 million pounds of fish and shellfish worth $69 million to commercial fisherman were landed in this region (Alaska Department of Fish and Game, 1980). This represents about 11 percent of the total Alaska landings. For the purpose of this analysis, a high economic impact on any commercial fishing industry results when there is a ten percent or greater economic loss to that industry. A moderate economic impact results when there is an economic loss of less than ten percent. A low economic loss results when there is a small economic loss to the industry. It should be recommended, however, that the loss to individual fishermen probably will be more serious than the loss to industry.

Impacts on commercial fisheries under the proposal would result largely from competition for labor, ocean space use conflicts, competition for infrastructure services, and reduced catch due to ecological loss (as discussed above). This analysis (except for reduced catch) draws largely from Tobolski et. al, (1981), which provides an analysis of fishing industry impacts in the Bering Sea.

Over the life of the proposal, about 0.6 oilspills greater than 1,000 barrels and 0.2 oilspills greater than 10,000 barrels are expected to result from Alternative I-1. Since fish resources are expected to sustain low ecological losses (see discussions in Section V.D.10.a.1.2.a), the commercial fishing industry could sustain low economic losses because there would be a loss in potential catch. These potential impacts are expected to be short term in

duration, and only occur once during the life of the field given the low number of expected spills.

A large oilspill could impact commercial fishing by causing a disruption in space and time. It is unlikely that commercial fishermen will harvest in the area of an oilspill because 1) their boats and gear may be contaminated, 2) they may be restricted from the contaminated area while clean-up efforts are underway, and 3) direct coating and incorporation of petroleum hydrocarbons can cause tainting of marine organisms, rendering them undesirable or unmarketable. This disruption in fishing would affect the nearshore salmon and shellfish fisheries to a greater degree than the offshore demersal fish fisheries. In the unlikely event that a large oilspill contacted this area during the height of the fishing season (varies by species) a moderate to high impact would result on the local fishery (especially on the salmon fishery). Regional economic impacts, however, would be low.

A big portion of fishery related labor in the region of interest is made up of fishermen whose earnings are lower than may be paid to unskilled workers in the oil and gas industry. This is likely to lead to a high willingness of this labor pool to transfer to OCS employment. However, because the number of jobs to which they would be attracted is limited and because there is a considerable excess in the number of crewmen available for fishing jobs, the impact due to labor competition would be very low.

Ocean space use conflicts consist of loss of and damage to fishing gear, loss of access to fishing grounds, and collisions among vessels. Fishing gear conflicts may result from: 1) oil fouling of gear (as stated above), 2) catching or "hanging" gear (trawl nets or scallop dredges) on obstructions such as pipelines and bulk material inadvertantly discarded by industrial operations, 3) and vessel traffic and seismic operations (trailing long seismic cables) in areas where pot-fishing (crab) and longline fishing (halibut) occur. Secondary economic impacts from gear conflicts occur from fishing time lost while waiting for repair or replacement of gear. This may be especially acute in these remote areas in Alaska where replacement gear must be shipped from distant suppliers and transportation services are limited.

The analysis for the St. George Basin (Tobolski, 1981) which projected the number of gear damage/loss claims that would be submitted as a result of oil and gas development concluded that there would be 5 claims ($90,000 in 1980 dollars) per year intially increasing to 12 claims ($216,000 in 1980 dollars) per year during full development. These results were based on the estimated future fishing effort and the projected number of oil and gas installations (platforms) with claim frequencies established for these parameters from North Sea historical data. Given that the intensity of fishing and OCS development is anticipated to be greater in the St. George Basin than in the Kodiak planning area the number of claims should be less. Even if the St. George figures are assumed, this would represent a total economic loss of less than .3 percent to the regional fishermen. However, this would represent a very high loss to individual fishermen.

The emplacement of one platform in the planning area would result in a loss of access of fishing grounds in the amount of 78.5 hectares (considering a 500 meter buffer radius for the platform). This represents an insignificant loss to the fishing industry.

Attempts by domestic fishermen to exploit the hitherto foreign dominated demersal fish resources will introduce new vessel traffic in the planning area. Similarly, the OCS supply and support vessels will bring additional traffic leading to increased chances of vessel collisions. This may be especially true in restricted areas such as the entrances to Kodiak and Port Lyons. However, the analysis for the St. George Basin (Tobolski, 1981) concluded tha only one collision would be expected in 20 years due to increased OCS vessel traffic. Given that OCS development in the Gulf of Alaska will not be as heavy as St. George, it is safe to assume that one vessel collision would be the upper limit for the life of the proposal for the Kodiak planning area. Such a collision may render only slight to moderate damage or even a complete loss (sinking) of one or both of the vessels involved. If the latter is the case, especially for a larger vessel (catcher-processor), the impact to the fishing industry could be moderate considering the 30 year life of the field.

The most likely damage, however, would be much less, because most collisions do not involve sinking or major damage. Statistics of casualties in U.S. waters show that the average value lost per vessel involved in a collision is approximately $22,137 (1980 dollars). If a fishing vessel is involved in a collision during the life of the proposal, then the annual loss equivalent would be $1107. The expected level of impact to the fishing industry, therefore, is low.

Conclusion: As a result of the proposal the expected level of impact on the commercial fishing industry in the Kodiak region is expected to be low. The loss to individual fishermen, however, could be high.

Cumulative Impacts: As previously noted, the cumulative impacts on fish resources (pink salmon, and herring) of this region as a result of oilspills would be low. As a result of this low ecological loss, the fishing industry would be expected to sustain a low economic loss.

Because total development of the Kodiak OCS would not substantially increase OCS activities in the region, other fishing industry impacts (i.e. competition for infrastructure services, ocean space use conflicts, and competition for labor) would not increase significantly over the impacts of the proposal (as stated above). An unknown number of oilspills may occur in the region from tankering of crude oil in other Federal, State and Canadian development projects.

The contribution of this alternative to the cumulative case is insignificant The contribution of this alternative when only the resources described in the alternative are leased (as opposed to the total development of OCS resources) would also insignificant.

b) Endangered Species: See discussion under Impacts on Endangered Species in the Gulf of Alaska section.

Conclusion. Very low impacts on endangered species are expected under this alternative.

Cumulative Impacts. If all areas of the Kodiak planning area are leased and all resources subsequently are developed over the life of the proposal, the expected number of oil spills is 3.9 spills greater than 1,000 barrels and 1.7

spills greater than 10,000 barrels. An additional unknown quantity of oil spills is expected to result from tankering from Federal OCS lease sales in the Shumagin, Cook Inlet, Hope, Norton, Navarin, St. George, and North Aleutian planning areas. An additional unknown number of oil spills could occur from development of State of Alaska territorial waters in Cook Inlet. An additional project or activity that could contribute to cumulative impacts in the planning area is commercial marine traffic. These projects or activities could affect endangered whales through an exchange in the number of oilspills and disturbance which may reduce population levels. The cumulative impacts of these oil spill events, projects, and activities are expected to produce a moderate-high impact to endangered whales, and a low impact to endangered birds in the Kodiak planning area.

In relation to the case of all resources in the planning area leased and developed, the alternative contributes 15 percent of spills greater than 1,000 barrels and 12 percent of spills greater than 10,000 barrels. These proportions are considerably less when the tankering from other Federal OCS planning areas and State lease sale areas (to an unknown extent) is considered. Here the alternative contributes little to the total cumulative case. Consequently, the most important causal agent for potential cumulative impacts on endangered whales is from tankering from other Federal and state lease sales. The contribution of the alternative to cumulative impacts is low for endangered whales, and very low for endangered birds in the case on only the resources described being developed or all resources leased and developed in the planning areas.

c) Habitats and Resources of Special Concern: More than a million seabirds and sea ducks, which would be vulnerable to oilspills, either breed on or overwinter in the Kodiak planning area, while the world's largest pupping grounds for harbor seals occur on Tugidak Island south of Kodiak Island within this planning area. The largest concentrations of Steller's sea lion in the Gulf of Alaska occur on Marmot Island and the Barren Islands and major populations of oilspill vulnerable sea otter are present on Afognak Island and the Barren Islands within this planning area. The major adverse impacts of OCS activities of the proposed could come from oil pollution of the marine environment and man-made disturbance.

The species most likely to be significantly affected by potential oilspills as a result of OCS activities in the Kodiak planning area are diving seabird species such as murres, auklets, and puffins, as well as sea ducks. Sea otters could also be significantly affected if an oilspill occurs. Oilspill contamination of important pupping and hauling out areas for seal and sea lion on Marmot, Tugidak, and the Barren Islands could also have significant effects.

Past oil tanker spill events of the early 1970's involving the dumping of ballast in the Kodiak-lower Cook Inlet area caused substantial marine bird mortality (greater than 10,000 birds) while the long-term effects of these incidents are unknown. A major oilspill in this area is likely to cause much greater impacts with possible long-term effects.

Conclusion. The impacts of OCS activity in this area will be moderate to high, depending on proximately to shore.

Cumulative Impacts. In the unlikely event that all areas of the Kodiak planning area are leased and all resources subsequently are developed over the life of the proposal, the expected number of oil spills is 3.9 spills greater than 1,000 barrels and 1.7 spills greater than 10,000 barrels. An additional unknown quantity of oil spills is expected to result from tankering from Federal OCS lease sales in the Shumagin, Cook Inlet, Hope, Norton, Navarin, St. George, and North Aleutian planning areas. An additional unknown number of oil spills could occur from development of State of Alaska territorial waters in Cook Inlet. Additional projects or activities that could contribute to cumulative impacts in the planning area are Sale 60, RS-2, and commercial fishing. These total projects or activities could affect birds in the following ways: through oilspills and disturbance reducing population levels and commercial fishing reducing food sources. The cumulative impacts of these oil spill events, projects, and activities are expected to produce a moderate-high impact to birds and marine mammals in the Kodiak planning area.

In relation to the unlikely case of all resources in the planning area leased and developed, the alternative contributes 15 percent of spills greater than 1,000 barrels and 12 percent of spills greater than 10,000 barrels. These proportions are considerably lower when the tankering from other Federal OCS planning areas (and State lease sale areas to an unknown extent) are considered. Here the alternative contributes little to the total cumulative case. Consequently, the most important causal agent for potential cumulative impacts on birds is from tankering from other Federal and state lease sales. The contribution of the alternative to cumulative impacts is low for both birds and mammals in the case on only the resources described as developed or all resources leased and developed in the planning areas.

d) Air Quality: A discussion of the primary factors used in assessing onshore air quality impacts which may result from OCS-related acitivites and the method employed in quantifying the impact on this planning area are described in Section V.A.3. of this document.

The following discussion is essentially the same as for the Gulf of Alaska. As is noted at the beginning of the discussion of impacts from development of hydrocarbon resources in the Kodiak planning area, all the resources and infrastructure for the South Alaska area were attributed to the Kodiak for the purpose of analysis. The resources and infrastructure are wholly assigned to each of the four South Alaska areas. Thus, it is estimated that 7 exploratory wells will be drilled to identify the resources and 26 development/production wells and one platform to develop the resources under this alternative. It was assumed for the purpose of analysis, that production from this platform would be 3.3 million barrels of oil and 26.7 billion cubic feet of gas per year. All of the oil and gas will be transported to shore via subsea pipeline. Estimated representative emissions for exploration/development are provided in Table IVD.10.a.2)d)-1. This information is derived from Table V.A.3-1.

Table V.D.10.a.2)d)-1. Estimated Representative Emissions

Activity	Production at Platform (tons per year)				
	VOC	NO_x	TSP	SO_2	CO
oil/gas	27	396	-	0.1	150

Offshore OCS facilities located within 20 miles of the Kodiak area shoreline are expected to need emission controls. The one platform associated with the development of resources under the proposal may be located within 20 miles of the coast and therefore require eimssion controls. One new gas processing plant may be required as a result of the proposal; however, as there are no nonattainment areas likely to be influenced by this activity in the planning area, the installation and operation of a gas processing plant is not expected to significantly influence the air quality rating of the area.

A low qualitative impact is expected from routine emissions. The area is in attainment for the primary pollutants; however, some effects will occur from both the onshore gas processing facility and the platform, should it be sited within 20 miles from shore. If it is located beyond 20 miles from shore, the impacts will be very low if a blowout, oilspill, or fire was to occur near shore, short-term violations of several NAAQ's could occur depending on the type and duration of the accident.

Any emission sources which would adversely affect the onshore air quality would be subject to mitigation required by EPA and the State, if located onshore, and DOI, if located on the OCS. ERG (1981) discusses mitigation measures for OCS facilities.

Conclusions. Overall, the level of expected impacts to air quality due to the proposal are very low to low. The siting of the platform within 20 miles of the coast and the necessity for emission controls on the platform is the determining factor for low.

Cumulative Impacts. It is estimated that a total of 850 million barrels of oil and 5.25 trillion cubic feet of gas exist in the entire South Alaska Federal OCS. In the event that total development of all Federal OCS resources occurs over the life of the proposal, 5 new platforms with 170 wells would be required. It is unlikely that this development would actually occur over the next 30-35 years. It is also highly unlikely that all of the development would occur in just one of the four South Alaska planning areas. However, for the purpose of impact analysis, it is assumed that total development occurs within this planning area.

The major factors affecting the onshore air quality in the planning area as a result of OCS development are 1) the number of new wells drilled, 2) the location of new platforms, 3) the timing of activities, and 4) the instantaneous local meteorological conditions. The development of this proposal contributes moderately to regional OCS cumulative air quality and onshore development (gas processing plants) contributes moderately to the regional and local OCS cumulative air quality impacts.

Portions of the planning area experience air pollutant contributions from fish processing plants, timber operations, and human settlement activities. The OCS development, both under the proposal and the total development of the resources in the area, is a main contribution to air quality changes in the area. However, no significant air quality impacts are anticipated from all activities within the entire area over the life of the proposal.

Overall, cumulative regional air quality impacts are expected to be low, local impacts will also be low. Environmental Protection Agency (EPA) rules

associated with the Clean Air Act and the DOI air quality rules have provisions to minimize these impacts.

e) Recreation and Tourism: Kodiak and the surrounding area receive much recreational and tourist usage, mainly in the summer. Beachcoming and camping are popular. Any OCS construction activities might locally restrict access to recreational areas, but would be of short duration. There may be some competition for local fish and game resources, but this, too, can be minimized through regulation. The proposal is likely to adversely affect recreational opportunities in locations subjected to OCS related onshore facilities. These adverse recrea-tional impacts would include alteration and destruction of wildlife habitat, temporary interference with and potential permanent damage to sport fishery areas, and increased recreational use by OCS support personnel. However, these impacts would be restricted to a few locations. The recreational im-pacts should not be significant, especially when and evaluating the impacts in context of the overall recreational opportunities of the archipelago.

The proposed action might result in significant adverse effects on the visual environment in cer-tain locations. Visual impacts would occur in natural landscapes of scenic quality which would be near an onshore marine terminal and LNG facility. Offshore tracts pose significant impacts to a lesser extent in terms of their distance from shoreline locations and visi-bility conditions.

Conclusion. The proposal is expected to have a very low impact on recreation and tourism.

Cumulative Impacts. If all potential oil and gas resources of the Kodiak planning area are leased and all resources subse-quently are developed over the life of the field, the expected number oil-spills is 3.9 spills greater than 1,000 barrels and 1.7 spills greater than 10,000 barrels. An additional unknown quantity of oilspills is expected to result from tankering from Federal OCS lease sale in the Shumagin, Navarin, St. George and North Aleutian planning areas. An additional unknown number of oil spills could occur from development of State of Alaska territorial waters in Cook Inlet, Bristol Bay, Hope and Norton. Additional projects of activities could contribute to cumul-ative impacts in the planning area are bottom fishing, hydroelectric projects and boat harbors in Kodiak and Port Lions. These total projects or activities could effect recreation and tourism in the following ways; population impacts, such as wear and tear on resources and positive impacts such as increased information from studies. The cumulative impacts of these oil spill events, projects and activities are expected to produce a moderate impact to recrea-tion and tourism in the Kodiak planning area.

In relation to the case of all resources in the planning area leased and developed, the alternative contributes 15 percent of spills greater that 1,000 barrels and 12 percent of spills greater than 10,000 barrels. These proportions are considerably lower when the tankering from other Federal OCS planning areas (and State lease sale areas to an unknown extent) are con-sidered. Here the alternative contributes low impact to the total cumulative case. Consequently, the most important causal agent for potential cumulative impacts on recreation and tourism is population pressure. The contribution of the alternative to cumulative impacts is low in the case of only the oil and

gas resources described as developed and is moderate in the case of all oil and gas resources leased and developed in the planning areas.

f) Socioeconomic Factors: The Kodiak area is one of four OCS planning areas within the large South Alaska region. (The other three are the Gulf of Alaska area, the Cook Inlet areas, and the Shumagin area.) Although the probability of the discovery of commercial quantities of petroleum somewhere within the South Alaska region is considered virtually a certainty, no information is presently available concerning the probabilities of commercial discoveries in the individual OCS planning areas within the South Alaska region. There also are no estimates available for the quantities of oil and gas expected from discoveries in the individual OCS areas, although estimates have been prepared for the South Alaska region as a whole. Consequently, employment and population impacts can be estimated for the South Alaska region, but not for the component areas.Within the South Alaska region, the discoveries expected to result from the proposed 5-year leasing program are 130 million barrels of oil and 0.79 trillion cubic feet of natural gas. The total cumulative discoveries,

Most petroleum workers who develop oil and gas resources within the South Alaska region would live in dormitories during work periods, and during rest periods would commute to residences in Anchorage. This would be true for petroleum developments in any of the four OCS planning areas within the South Alaska region. The long-term statewide employment impact of petroleum discoveries in the South Alaska region resulting from the proposed 5-year leasing program would probably be about 300 additional jobs, including all direct and indirect employment effects. The corresponding population impact would be about 600 additional permanent residents of Alaska. Almost all of the resident population impact would probably occur in Anchorage.

Conclusion. Even with a commercial discovery, most of the impacts would occur in the form of 600 additonal people in the State, mostly in Anchorage, which could handle the increase. Otherwise, the level of expected impacts is low.

Cumulative Impacts: If all areas of the Kodiak planning area are leased and all resources subsequently are developed over the life of the proposal, the total cumulative impacts on resident employment and population in the adjacent land area (Kodiak census division) during the years 1980 - 2000 could be very high in the sense that potentially significant long-term stress would be imposed on public and private services and facilities in the adjacent Kodiak census division. These cumulative impacts include all anticipated non-OCS activities as well as all OCS activities, in this planning area or in other planning areas, which are expected to have employment or population impacts in the land area adjacent to the Kodiak OCS planning area.

The principal non-OCS activity expected to result in employment and population growth is the anticipated rapid expansion of the U.S. bottomfish industry, which is expected to largely displace the huge foreign bottomfish operation in the area by the year 2000. This expansion could cause a 60 percent increase in the employment and population of the Kodiak census division.

OCS activities in other planning areas are not expected to generate significant employment or population impacts in the Kodiak census division.

The exact impacts of the OCS activities in this planning area cannot be estimated at this time, due to the lack of information regarding petroleum resources in the area. (The relevant information provided by USGS is that the mean expected development of resources is 130 million barrels somewhere in the vast South Alaska region, which includes not only the Kodiak planning area but also the Cook Inlet, Gulf of Alaska, and Shumagin planning areas. Total oil resources for the entire South Alaska region are estimated at 850 million barrels, as indicated in Table 4.)

g) Native Subsistence Cultures: The Kodiak planning area embraces the southern and eastern sides of Kodiak Island. In addition to the villages on the Island covered under the Cook Inlet planning area discussion (Karluk, Port Lions and Larsen Bay), Kodiak Island also contains the villages of Ouzinkie, Old Harbon and Akhiok. These relatively isolated Aleut villages have long maintained a distinctive Aleut-Russian culture and way of life that they value highly and want to maintain. Each village is composed of from one to three extended families who are socially, economically and culturally organized around subsistence and commercial fishing, hunting and gathering activities. The combined population of the latter three incorporated villages in 1980 was 618 persons, with Old Harbor having the largest population of 340. More than 90 percent of the total population of each village in 1980 was Aleut, for a total of some 580 Aleut people. Traditional Alaskan subsistence lifeways are evident elsewhere on the Island with scattered family units and within segments of the population of the city of Kodiak itself.

Direct impacts on the villages from population growth associated with the alternative are unlikely on Kodiak Island, as discussed under the Cook Inlet planning area, since existing industrial and urban infrastructure can be expected to be used. Potential local impacts from establishing an oil terminal near the community of Port Lions were analyzed in the OCS Lease Sale 60 FEIS as an example of potential consequences of such an event. Indirect effects from the alternative from village skill outmigration also should be unlikely, since such periodic events have been a necessary part of village life for some time.

Disruption in the access to or availability of local marine resources, especially salmon, sea lion and intertidal resources from the effects of localized oilspill events could have major impacts on village sociocultural systems. The statistically derived mean number of spills equal to or greater than 1,000 barrels is 0.6 for the planning area. The comparable statistic for spills equal to or greater than 10,000 barrels is 0.2. Spills reaching locations critical to specific marine resources used locally or within the immediate vicinity of the villages, where beaches, bays and lagoons are intensively used for subsistence resource harvest, could produce direct and indirect impacts on local sociocultural systems. Spills affecting commercial salmon harvest could affect the total livelihood pattern of the villages througout Kodiak Island. Impacts could be realized as discussed for the Gulf of Alaska and Cook Inlet planning areas.

Conclusion. Impacts on native subsistence cultures over the life of the alternative are expected to be low as a result of the low number of expected spills and the unlikely prospect of oil and gas facilities being located near or within Aleut villages on the Island.

Refer to the Gulf of Alaska impact analysis on birds, fish, and habitats and resources of special concern (Sec.V.D.9.a.2) a) through c) for more detailed discussions of the topics covered in this section.

Cumulative Impacts. If all areas of the Kodiak planning area are leased and all resources subsequently are developed over the life of the proposal, the expected number of oilspills is 3.9 spills greater than 1,000 barrels and 1.7 spills greater than 10,000 barrels. An additional unknown quantity of oilspills is expected to result from offshore activities and tankering from the Federal OCS activity in other areas which is transported through the area via tanks. Oilspills may also occur in the area from tankering of Canadian Beaufort crude. Additional projects or activities that could contribute to cumulative impacts in the planning area are employment and population increases associated with bottomfishing industry development and hydroelectric projects.

These total projects or activities could effect native subsistence cultures in the folling ways: oilspills or other disturbances to local subsistence resources could divert, displace or reduce the availability of local subsistence resources where they were traditionally found; could disrupt traditional subsistence effort patterns to an extent as to reduce subsistence catch of the resources customarily used; could prevent the pursuit of subsistence practices by segments of the population due to the costs of using an increased subsistence range; could disrupt traditional cultural and spiritual patterns (of obligation fulfillment for kinship-based assistance networks and care of the elderly, as examples), and could induce chronic stress and anxiety over imbalances in nature, the fear of further changes in such relationships, and the inability to do anything about it. Impacts from such effects could include increased disease, malnutrition and mental disorders, family breakup and conflict, substance abuse, and generational conflict. Localized impacts could be magnified within the region through the breakdown of customary inter-village (through family networks) resource distribution patterns and obligations.

The cumulative impacts of these oilspill events, projects and activities are expected to produce a low to moderate impact to native subsistence cultures in the Kodiak planning area.

3) Impacts on Other Management Plans:

Coastal Zone Management: The two jurisdictions that would be impacted by a sale are the Kodiak Island Borough and the Kenai Peninsula Borough.

Both boroughs have local coastal programs underway. The Kenai Borough has generally been receptive to oil and gas activities and facilities, and the Kodiak Borough and an OCS Advisory Council that would look at impacts and the ramifications of holding the sale. The regulatory provisions of the ACMP, which require accommodation of oil and gas facilities, apply in any case.

4) Unavoidable Adverse Impacts: Oilspills, discharges of drilling effluents (muds, cuttings, and formation waters) and sewage disposal would result in unavoidable adverse impacts to water quality under the proposal. Impacts from all the above except oilspills could be mitigated by EPA NPDES regulation.

Water supply would be unavoidably adversely affected by this proposal. Limited supplies would be consumed by OCS-related infrastructure and development, creating demands on supplies of unknown quanity.

The unavoidable adverse impact for land use would be a reducetion in the amount of land available for other uses. Occupation of land by OCS-related activities and structures would be minimal.

Coastal ecosystems would be unavoidably adversely affected by oilspills and various discharges as mentioned above for water quality. The level of impact would be restricted both geographically and temporally.

The proposal would have unavoidable adverse impacts on fish by oilspills contacting nearshore habitats or eggs and larvae which occur on or near the surface. Oilspills would also affect commercial fishermen by reducing the number of harvestable fish. These impacts are expected to be minimal.

Birds, marine mammals, and endangered species would also suffer unavoidable adverse impacts from oilspills. The level of impact would depend on when and wher the oilspill occured. Regional endangered species consultation with NMFS and FWS is required and would be conducted as needed.

Recreation and tourism resources could be adversely affected unavoidably by damage to visual resources through the intrusion of onshore support infrastructure and road systems, nearshore systems of causeways, pipelines and drilling islands, offshore oil and gas platforms, and vessel and aircraft traffic supporting such operations. Such effects would be localized and may serve as an attraction to a segment of the recreation and tourism population.

Cultural resources offshore, such as housepits, burins, scrapers, arrowheads and other artifacts, could be unavoidably destroyed through OCS operations, but the great dynamics of the marine environment already may hve resulted in the destruction of many of these resources. Cultural resources located onshore could be lost or damaged by public pilfering or indiscriminate exposure of artifact sites.

Introduction of urban and industrial land uses, except for regional urban centers, would change the character of isolated, de facto wilderness areas, but impacts would be isolated and small in relation to the total area involved. Where urban centers are involved, land use demands generated by OCS activities could unavoidably produce adverse effects derived from the rate and relative scale of demand. Land speculation and price inflation could be experienced as well as interruptions in community facilities and infrastructure during the period necessary for such aspects of land development to catch up with increased land use demands.

Native subsistence cultures could be adversely affected directly in an unavoidable way through accidental oilspills and an increase in population, causal agents which could affect the access to and availability of subsistence resources. Such impacts have been discussed previously. Perhaps more insidious are the indirect adverse effects which could be caused unavoidably by nature of kinship-based social networks existing between regional centers and villages and the periodicity of urban-village migration customary in village regions. Localized effects in villages could have adverse affects throughout

the village region. Disruption of customary urban-village migration patterns, through affects such as urban housing shortages, price inflation or reduced supply of public services, could cause hardship for those segments of the population unable or unwilling to adapt to such changes and contribute to social disorder and disorientation of cultural value systems.

5) Relationship Between Local Short-Term Uses of Man's Environment and Maintenance and Enhancement of Long-Term Productivity:

The effects of the alternative would vary in kind, intensity, and duration, beginning with preparatory activities (seismic data collection and exploration drilling) of oil and gas development, and ending when natural environmental balances might be restored.

Biological productivity would be lost in the short-term on all onshore lands used in the proposed project. These areas could be returned to productivity in the long-term with proper management. Restoration may not be entirely feasible; however, the overall loss would be a minor adverse effect. The direct land requirements would show in both the short-term and the long-term because of disturbance. Major construction projects would cause definite changes in both the short-term and long-term. Some species may have difficulty repopulating and could be displaced.

Short-term oil pollution and the possibility of long-term cumulative oil pollution impacts could cause serious adverse effects on all components of the marine ecosystem, including fisheries. While restoration would allow fisheries production to regain original levels, any reduced annual harvests during the life of the project would be irretrievably lost. The extent is not known presently, but the potential must be recognized.

The biota would be threatened in the short-term by potential oil pollution. Direct mortality could be significant through the combined effects of harassment by humans and the increased volume and frequency of noise from vessel traffic or overflying aircraft. In the long-term, such disturbances could alter behavior patterns and could drive fauna away from traditional feeding and breeding grounds or to other critical areas within their range, reducing species populations over a long period of time.

Habitat destruction could cause a reduction in subsistence species which could threaten the regional economy. The improved accessibility to primitive areas from increased construction is a short-term result of this alternative. The overall wilderness value of the coast may decrease from increased land use. Increased human populations in the short-term could change the regional native culture in the long-term. The subsistence way of life could be modified andpopulation shifts could occur. The overall changes cannot be termed positive or negative, except by those affected.

Archaeologic and historic values discovered during development would enhance long-term knowledge. Overall, finds may help to locate other sites, but destruction of artifacts would represent long-term losses.

Consumption of offshore oil and gas would be a long-term use of non-renewable resources. Economic, political, and social benefits may accrue from the availability of oil and gas. Most benefits would be short-term and would decrease the nation's dependency on oil imports.

The production of oil and gas from the planning area would provide short-term, critically needed energy, and perhaps provide time either for the development of long-term alternative energy sources or substitutes for petroleum feedstocks. Petroleum development in these areas may mean the irreplaceable loss of some fisheries production. The maintenance and enhancement of long-term productivity would depend on efforts to control water quality levels. Regional planning would aid in controlling changing economics and populations, and thus, in moderating any adverse impacts.

6) Irreversible and Irretrievable Commitment of Resources

a) Mineral Resources: Resources discovered would be irretrievably consumed.

b) Biological Resources: Commercial fishery losses may occur principally by oilspills interfering with salmonid migrations or by their direct contact with larval fishes and/or their planktonic food supplies. Any losses of commercial fishing incomes attributable to this alternative would be irreversible and irretrievable to the extent they were uncompensated. Unharvested commercial finfish and shellfish, as renewable resources, would be irretrievably lost to the economy.

Increased air and ship traffic and onshore activites, as well as potential habitat degradation or reduction in available food resulting from oil and gas industry operations could displace birds and mammals into less favorable environments, ultimately resulting in reduced population levels. Displacement could become irretrievable if permanent alterations of the environment were maintained by such activities.

c) Endangered Species: Under the Alternative, it is possible [illegible] endangered whales could be subjected to irreversible direct and indirect effects of oilspills, disturbance due to noise and other human activities, or losses and/or deterioration of habitat due to facility developments. Whether such effects would lead to permanent (irreversible) losses of whale resources is unknown.

d) Social Systems: Village subsistence practices could be affected irreversibly by the displacement of subsistence resources from locally-used customary habitat or by the reduction of resources through the modification of favorable habitat. The displacement could be irretrievable if the effect were maintained over time. Irreversible changes in cultural values and orientations could occur from the proposal, but the irretrievable nature of these changes to sociocultural systems is unknown.

A high growth situation could cause increased housing costs and shortages and could place extreme demands on utility services such as electrical power, water, sewage, and solid waste disposal. Attempts to provide basic service levels for the above items to meet increased population levels could force communities to forego improvements to the existing services.

THE MORE SIGNIFICANT ENVIRONMENTAL CONSEQUENCES

Kodiak

Resource Category	Level of Expected Impacts* Scheduled Sales Only Under Alternative I-1	Cumulative Impacts of All Activities
1. General Impacts		
a. Coastal Ecosystems	low	moderate
b. Water Quality and Supply		
Water Quality	low	low
Water Supply	very high	very high
c. Navigation and Shipping	very low	very low
d. Other Uses of the OCS	n/a	n/a
e. Land Use	low to moderate	high
f. Cultural Resources	low	moderate
2. Impacts of Special Concern		
a. Fish and Commercial Fisheries		
Fish Resources	low	low
Commercial Fisheries	low	low
b. Endangered Species		
Cetaceans	very low	moderate to high
Birds	very low	low
c. Habitats and Resources of Special Concern		
Birds	moderate to high	moderate to high
Mammals	moderate to high	moderate to high
d. Air Quality	very low to low	low
e. Recreation and Tourism	very low	moderate
f. Socioeconomic Factors	low	low
g. Native Subsistence Cultures	low	low to moderate

* Definitions of level of impact are provided at the beginning of Section V.D.

(This table also applies to Alternative I-2, II, IV-1, and IV-2. See text.)

Due to the increase in air and marine traffic generated by this alternative and, importantly, the severely inclement weather to which the area is prone, it is highly probable that there would be an increase in transportation related fatalities over the life of the proposal.

e) Economic Systems: The only commitment that could be considered possibly irreversible and irretrievable would be the economic risk, resulting from OCS activity, of destruction of commercial fisheries resources or destruction of other fauna or flora used for subsistence by area residents.

f) Cultural Resources: The destruction of an underwater OCS cultural site would possibly result in an irreversible and irretrievable loss of prehistoric information about human occupancy.

b. Alternative I-2

Resource estimates and attendant activities, and oilspill probabilities for the Kodiak area are the same for this alternative as for Alternative I-1. This being the case, impacts resulting from this alternative would be the same as those described for Alternative I-1. In addition, impacts on other management plans and unavoidable adverse impacts would be the same as described for Alternative I-1. The relationship between short-term use of man's environment and long-term productivity for this alternative is the same as that described for Alternative I-1. The irreversible and irretrievable commitment of resources associated with this alternative is the same as described for Alternative I-1.

c. Alternative II

Resource estimates and attendant activities, and oilspill probabilities in the Kodiak area are the same for this alternative as for Alternative I-1. This being the case, impacts resulting from this alternative would be the same as those described for Alternative I-1.

For the cumulative case for this alternative, the number of oilspills associated with tankering of oil through the Kodiak area from other OCS planning areas would be insignificantly different from Alternative I-1. The addition of the St. Matthew-Hall area makes no difference since no resource development is expected there. In addition, all other projects and proposals assumed for the cumulative case for Alternative I-1 are also assumed for this alternative. Thus, cumulative impacts for this alternative would be the same as those described for Alternative I-1.

d. Alternative III-1

Discussion of general impacts, impacts of special concern, other management plans, unavoidable adverse impacts, relationship between short-term use of man's environment and long-term productivity, and irreversible and irretrievable commitment of resources is not neccessary as no resources would be leased in the Kodiak area under this alternative. This alternative would cause no direct impacts to the area. The only impacts would come from other projects and proposals and tankering of oil from other proposed OCS areas.

THE MORE SIGNIFICANT ENVIRONMENTAL CONSEQUENCES

Kodiak

Resource Category	Level of Expected Impacts* Scheduled Sales Only Under Alternative III-1	Cumulative Impacts of All Activities
1. General Impacts		
a. Coastal Ecosystems	n/a**	moderate
b. Water Quality and Supply		
Water Quality	n/a**	low
Water Supply	n/a**	very high
c. Navigation and Shipping	n/a**	very low
d. Other Uses of the OCS	n/a	n/a
e. Land Use	n/a**	high
f. Cultural Resources	n/a**	moderate
2. Impacts of Special Concern		
a. Fish and Commercial Fisheries		
Fish Resources	n/a**	low
Commercial Fisheries	n/a**	low
b. Endangered Species		
Cetaceans	n/a**	moderate to high
Birds	n/a**	low
c. Habitats and Resources of Special Concern		
Birds	n/a**	moderate to high
Mammals	n/a**	moderate to high
d. Air Quality	n/a**	low
e. Recreation and Tourism	n/a**	moderate
f. Socioeconomic Factors	n/a**	low
g. Native Subsistence Cultures	n/a**	low to moderate

* Definitions of level of impact are provided at the beginning of Section V.D.

** Differs from the proposal.

Cumulative impacts are as those described for Alternative I-1, as the cumulative impact analysis is not temporally constrained and assumes total development of resources at some point in the future.

e. Alternative III-2

Resource estimates and attendant activities, and oilspill probabilities for the Kodiak area are the same for this alternative as for Alternative I-1. Thus, discussion of general impacts, impacts of special concern, other management plans, unavoidable adverse impacts, relationship between short-term use of man's environment and long-term productivity, and irreversible and irretrievable commitment of resources is not necessary as no resources would be leased in the Kodiak area unde this alternative. This alternative would cause no directs impacts on this area.

The only impacts would come from other projects and proposals and tankering of oil from other proposed OCS areas. Cumulative impacts are as described for Alternative I-1, analysis of cumulative impacts is not temporally constrained and assumes eventual total development of the resources.

f. Alternative IV-1.a

Resource estimates and attendant activities, and oilspill probabilities in the Kodiak area are the same for this alternative as for Alternative I-1. This being the case, impacts resulting from this alternative would be the same as those described for Alternative I-1. For the cumulative case for this alternative, the number of oilspills associated with tankering of oil through the Kodiak area from othe OCS planning areas is as described for Alternative I-1. In addition, all other projects assumed for the cumulative impact analysis for Alternative I-1 are the same for this Alternative. Thus, cumulative impacts for this alternative would be the same as those described for Alternative I-1. Impacts on other management plans and unavoidable adverse impacts would be the same as described for Alternative I-1. The relationship between short-term use of man's environment and long-term productivity for this alternative is the same as that described for Alternative I-1. The irreversible and irretrievable commitment of resources associated with this alternative is the same as described for Alternative I-1.

g. Alternative IV-1.b

Impacts from the adoption of Alternative IV-1.b. are as described above under Alternative IV-1.a (and Alternative I-1).

h. Alternative IV-2.a.

Resource estimates and attendant activities, and oilspill probabilities for the Kodiak area for this alternative are as described for Alternative I-1. Impacts on other management plans and unavoidable adverse impacts would be the same as described for Alternative I-1. For the cumulative case for this alternative, the number of oilspills associated with tankering of oil through the Kodiak area from other OCS planning areas would be insignificantly different from Alternative I-1. Dropping the Arctic sales, particularly the Barrow Arch sale, would result in some lesser amount of oil being transported by tanker through the Kodiak area for the 30 year life of the proposal. The reduction could

THE MORE SIGNIFICANT ENVIRONMENTAL CONSEQUENCES

Kodiak

Resource Category	Level of Expected Impacts* Scheduled Sales Only Under Alternative III-2	Cumulative Impacts of All Activities
1. General Impacts		
a. Coastal Ecosystems	n/a**	moderate
b. Water Quality and Supply		
Water Quality	n/a**	low
Water Supply	n/a**	very high
c. Navigation and Shipping	n/a**	very low
d. Other Uses of the OCS	n/a	n/a
e. Land Use	n/a**	high
f. Cultural Resources	n/a**	moderate
2. Impacts of Special Concern		
a. Fish and Commercial Fisheries		
Fish Resources	n/a**	low
Commercial Fisheries	n/a**	low
b. Endangered Species		
Cetaceans	n/a**	moderate to high
Birds	n/a**	low
c. Habitats and Resources of Special Concern		
Birds	n/a**	moderate to high
Mammals	n/a**	moderate to high
d. Air Quality	n/a**	low
e. Recreation and Tourism	n/a**	moderate
f. Socioeconomic Factors	n/a**	low
g. Native Subsistence Cultures	n/a**	low to moderate

* Definitions of level of impact are provided at the beginning of Section V.D.

** Differs from the proposal.

result in a minimal reduction in the number of tanker spills. However, as the cumulative impact analysis is not temporally constrained (assuming total development of all areas) the cumulative impacts of this alternative on the Kodiak area resources is as described in Alternative I-1. Impacts on other management plans and unavoidable adverse impacts would be the same as described for Alternative I-1. The relationship between short-term use of man's environment and long-term productivity for this alternative is the same as that described for Alternative I-1. The irreversible and irretrievable commitment of resources associated with this alternative is the same as described for Alternative I-1.

i. Alternative IV-2.b.

Impacts from the adoption of this alternative are as described above under Alternative IV-2.a.

11. Cook Inlet

a. Alternative I-1

1) General Impacts

a) Coastal Ecosystems: Important coastal ecosystems of the Cook Inlet planning area are the tide-dominated bayhead estuarine coast lines and protected estuarine sale marshes. Areas of primary concern include the razor clam beds of eastern Cook Inlet from Kasilof to Anchor Point; western Cook Inlet (Harriet Point and Chinitna Bay) and northwestern Shelikof Strait. Other areas of concern are teh intertidal areas of Kamishak Bay, southern Kąchemak Bay, and western Cook Inlet (Chinitna and Texedni Bay). These latter areas consist of either estuarine marsh or estuaries having muddy or sandy bottoms with limited circulation patterns. These same areas also are inhibited by important fish, birds, and marine mammals. Impacts on these resources are discussed in Section V.D.11.a.2.a), b) and c). Impacts to these coastal ecosystems would result largely from oilspills.

Over the life of the proposal, 0.6 oilspills greater than 1,000 barrels and 0.2 spills greater than 10,000 barrels are expected to result from Alternative I-1 South Alaska sales. For the sake of analysis all the south Alaska sales resource estimates and resultant developments are assumed to occur in the Cook Inlet planning area. Should spill oil contact these habitating it, may persist for up to 10 years, especially tide-dominated bayhead depositional coastline. Infauna, such as razor clams, are one of the main organisms that might be affected by oilspills contacting the coastline. After the Amoco Cadiz tanker spill in France, many razor clams died. Razor clams in Shelikof Strait and lower Cook Inlet occur in large, commercial concentrations in several areas. Most of these beaches have an oilspill persistence rating of less than 1 year, so the toxic effect of any spill on the razor clam population may persist for that length of time. Even if the razor clams are not killed, a spill may taint the clams and the area would likely be closed to clamming. After an oilspill in another area (Buzzards Bay, Massachusetts) all of the shellfish beds on the eastern shore of the bay were closed for one and half years (Palmer, 1980). The effect of a closure would be most disruptive along the eastern part of lower Cook Inlet (Clam Gulch) where a million razor clams are removed annually by sport fishermen.

Given that only one large spill is likely to occur under this proposal the level of expected impacts to the regional coastal ecosystems is low. However, a localized impact could occur with long-term (up to 10 years) consequences (i.e. contamination of clam beds).

Conclusion. The level of impacts to the coastal ecosystems of the Cook Inlet planning area is expected to be low.

Cumulative Impacts. If all areas of the Cook Inlet planning area are leased and all resources subsequently are developed over the life of the proposal, the expected number of oilspills is about 3.9 spills greater than 1,000 barrels and about 1.7 spills greater than 10,000 barrels. An additional unknown number of oilspills also could occur from development of State of Alaska territorial waters in Cook Inlet along with the existing Federal leases in Cook Inlet. These total project or activities could effect coastal ecosystems by increasing

the risk of oilspill occurrance. The cumulative impacts of these oilspill events, projects and activities are expected to produce a moderate impact to coastal ecosystems in the Cook Inlet planning area.

In relation to the case of "all resources in the planning area leased and developed," the alternative contributes 15 percent of spills greater than 1,000 barrels and 12 percent of spills greater than 10,000 barrels. These proportions are reduced substantially existing Federal OCS leases and the proposed State lease sale are considered. Here the alternative contributes moderately to the total cumulative case. Consequently, the most important casual agent for potential cumulative impacts on the coastal ecosystems is the proposed State leases due to their clos proximity to these habitats. The contribution of the alternative to cumulative impacts is low in either the case of only the resources described as developed or all resources leased and developed in the planning area.

b) Water Quality and Supply

Water Quality: Onshore water quality impacts are similar to those found for the Gulf of Alaska under the proposal. Existing water quality offshore is good. Existing waste water discharges in Cook Inlet are several and are comprised of sanitary wastes and urban run-off from coastal communities. Upper Cook Inlet has suffered 581 recorded oilspills (mostly non-oil industry) between 1965 and 1980, most very small but including one 10,000 barrel spill (Lower Cook Inlet-Shelikof Strait FEIS sale 60). Water quality in Cook Inlet has been impacted by oil industry discharges in State and Federal water without demonstrated effect. The additional lease sale in the proposal, if gas and oil were found in expected quantities, would generate an additional 44 million barrels of formation waters. Only 0.6 oilspills of 1,000 barrels or more and 0.2 of 10,000 barrels or more are projected for this alternative. During the years of exploratory and developmental drilling, 8,250 cubic yards of drill cuttings and 115,000 barrels of drilling mud would be discharged into Cook Inlet. These discharges would measurable increase short-term turbidity over about 0.07 percent of the planning area. Discharge of formation waters could add the equivalent of 12,000 barrels of oil to Cook Inlet over the life of the field. In the absence of a major oilspill the additional offshore leasing offered in this proposal would result in no appreciable loss of water quality.

Water Supply: Although water supply facilities are best developed in the Cook Inlet region of Alaska, facilities are stressed and will likely not be able to meet available demands of the oil industry.

Conclusions. The effects of oil and gas development in this planning area on water quality will be low, except in the immediate number of platforms. Water resources are well developed but stressed near the area. New or expanded facilites will be needed, causing high impacts.

Cumulative Impacts: Water quality: If all potential oil and gas resources of the Cook Inlet planning area are leased and subsequently developed in a timely manner, the expected number oilspills is 3.9 spills of 1,000 barrels or more with 1.7 spills of at least 10,000 barrels. No additional oilspills are expected to result from tankering from Federal OCS lease sales in other planning areas. An additional unknown number of oilspills could occur from development of State of Alaska onshore and offshore reserves in Cook Inlet

(sales 35, 40, 49). Oil industry development of all gas and oil reserves in the Cook Inlet planning area would result in discharge of 52,500 cubic yards drill cuttings and 735,000 barrels of drilling mud during drilling phases. Formation waters produced would total 289 million barrels over the life of the field. Additional projects or activities that could contribute to cumulative impacts in the planning area are coal mining and export, increased commercial traffics, offshore gold dredging, and upgrading of fish processing facilities. These projects and activities could effect water quality in the following ways. Sewage, fish waste, and suspended solid inputs from these projects and activities could locally degrade water quality by increasing turbidity, decreasing oxygen levels, and stimulating algal bacterial growth. There would also be additional residue of fuel spills. The cumulative impacts of these oilspill events, discharges, and additional traffic are expected to produce a low impact to water quality in the planning area.

In relation to the case of all resources in the planning area leased and developed, the Cook Inlet planning area in this alternative contributes 15 percent of spills of 1,000 barrels or more and 12 percent of spills of at least 10,000 barrels. The Cook Inlet planning area in this alternative would provide 25 percent of cumulative impact to the planning area from drill cuttings, 63 percent of the impact from drilling mud, and 11 percent of the impact from formation waters. The greatest threat to Cook Inlet water quality is from oil pollution.

The percentage of cumulative impact from oil pollution due to development within the Cook Inlet planning area portion of the alternative is reduced slightly when tankering from existing and proposed State leases are considered. The Cook Inlet planning area in this alternative contributes very slightly to the total cumulative planning area case. The most important causal agent for potential cumulative impact on water quality is oil pollution from cumulative Federal OCS leasing in the planning area. The contribution of the Cook Inlet planning area in this alternative to planning are cumulative impacts is low in the case of only resources described as developed or is very low in the case of all resources leased and developed in the planning areas.

Water Supply: If all potential oil and gas resources of the Cook Inlet planning area were leased and developed, new water supply facilities would be required, causing high impact. Other cumulative impacts are expected from existing state and federal leases in the Cook Inlet area, onshore and offshore mining, the fish processing industry, from population growth caused by concentration of Alaskan oil industry infrastructure in Anchorage, and general increases in commerical infrastructure; the sum effect of these additional impacts is also likely to be high. It is unknown whether the proposed action in this planning unit under this alternative would constitute a major portion of total water supply needs.

c) Navigation: The Cook Inlet is currently an area of marginal oil and gas resources. Expected mean case discoveries for the oil and gas estimates for the Cook Inlet are currently hardly sufficient to justify the emplacement of one production platform. Given the low resource estimates it is highly unlikely that the activities associated with either exploration or development would cause any impacts to navigation.

Conclusion. Impacts to navigation as a result of this sale will be low.

Cumulative Impacts. Principle contributors of potential impacts to navigation systems within the Cook Inlet planning area would be: oil tankering from past and future sales (35, 40, 49), State and Federal Sale 60, and the movements of general commercial cargo traffic. Currently within the Cook Inlet the following major projects effect the navigation systems of the area: the exportation of the beluga coal fields, the expansion of the Homer fish processing facility, and the existence of hydrocarbon related procesing activities in the upper Cook Inlet.

Estimated as well as present projections of vessel traffic make the Cook Inlet one of the most heavily traveled waterways in Alaska. Navigational impacts resulting to the Inlet as a result of either the cumulative or mean resource case of the proposal is expected to be low to very low. When either case is measured against current and projected inlet vessel use, it is estimated they would generate less than 1 percent of all traffic and present minimal impacts to navigation.

d) Other Uses of the OCS: Cook Inlet is heavily used for recreation and tourism, commercial and sport fishing and marine transport. There have not been any appreciable impacts from previous sales, and additional impacts should be negligible.

Conclusion. No impacts. (The main uses of the OCS are fishing and recreation, both discussed in other sections.)

e) Land Use: The infrastructure is presently available for exploration and development/production in Cook Inlet, as a result of State lease sales in upper Cook Inlet, and sales CI and 60 in lower Cook Inlet. Therefore, enclave development is not necessary. Dock facilities are available at Homer and Nikiski, services are available at Homer, Kenai, and Nikiski, and there are existing oil terminals and an LNG plant at Nikiski. There are also roads and airports in the Kenai Peninsula Borough which connect these communities with Anchorage and Seward.

Conclusions. The areas close to shoreline pollution are well developed, and any additional land use impacts would be minimal.

Cumulative Impacts. Other projects that will affect land use in the Cook Inlet area are: The development of State oil, the increasing population of the Cook Inlet region, the Bradley Lake hydroelectric project, and the expansion of the Homer fish processing facilities. These should affect land use in the following ways: The Inlet will become increasingly urbanized, especially if additional oil and gas deposits are found in the region. Also, additional power will become available for added industrial growth. It is expected that additional land use impacts becasue of oil and gas development would affect 100-125 acres of land, because of the need for an oil and/or gas terminal/processing facility. Existing infrastructure should eliminate the need for constructing additional facilities. OCS development would result in minor (low) changes in land use. Much of the infrastructure exists currently to accommodate OCS development. However, OCS development would contribute to the area's increasing urbanization.

For the total development scenario, land use impacts from the high case would affect 300 acres of land because of the need for a large oil and gas processing

facility, living quarters for operations and construction personnel, warehouses, dock facilities, and a material support facility. The maximum resource development would result in moderate changes in land use. Impacts would depend on the location of the facility. Location of the plant further south on the coast of the Kenai Peninsula could disrupt recreational land use and interfere with the Kenai Borough Comprehensive Land Use Plan.

f) Cultural Resources: The onshore cultural resources in the area of the proposed sale may be directly, adversely affected if a major oilspill reaches the shoreline. (See Sale 60 FEIS for details and impacts of resources.) Oilspill risk for shore sites is generally moderate. Onshore sites could be adversely affected by construction activities, industrialization, increased population in the area, and changes in land use status.

Conclusion. Impacts on cultural resources will be low to moderate, as oilspills in a confined area pose a greater risk than those in an open sea area.

Cumulative Impacts. If all areas of the Cook Inlet planning area are and all resources subsequently are developed over the life of the proposal, the expected number of oilspills is 3.9 spills greater than 1,000 barrels and 1.7 spills greater than 10,000 barrels. An additional unknown number of oil spills could occur from development of State of Alaska territorial waters in Cook Inlet. Additional projects or activities that could contribute to cumulative impacts in the planning area are tankering (State and Federal) platforms, pipelines, coal, and gold port expansion. These total projects or activities could affect cultural resources in the following ways: population impacts, looting, oiling of artifacts, and positive impacts such as increased formation from surveys. The cumulative impacts of these oilspill events, projects, and activities are expected to product a moderate impact to cultural resources in the Kodiak planning area.

In relation to the case of all resources in the planning area leased and developed, the alternative contributes 15 percent of spills greater than 1,000 barrels and 12 percent of spills greater than 10,000 barrels. These proportions are reduced considerably when the tankering from other Federal OCS planning areas (and State lease sale areas to an unknown extent) are considered. Here the alternative contributes little to the total cumulative case. Consequently, the most important causal agent for potential cumulative impacts on cultural resources is population impacts. The contribution of the alternative to cumulative impacts is low in the case of only oil and gas the resources described as developed and is moderate in the case of all resources leased and developed in the planning areas.

2) Impacts of Special Concern

a) Fisheries

(1) Important Fish Resources: The important commercial fishery resources of the Cook Inlet include all five species of Pacific salmon, king crab, Tanner crab, and dungeness crab, shrimp, scallops, Pacific herring, halibut and several species or groups of bottomfish (ocean perch, blackcod, walleye pollock, Pacific cod, sole, and flounder). Subsistence fisheries tend to rely more heavily of salmon, and to a lesser

degree on crab and other shellfish. Impacts to these resources would result from accidental oilspills and discharge of drilling effluents and wastes.

Over the life of the proposal, 0.6 oilspills greater than 1,000 barrels and 0.2 oilspills greater than 10,000 barrels are expected to result from Alternative I-1 South Alaska sales. For the sake of this analysis all the South Alaska sales resource estimates and resultant development are assumed to occur in the Cook Inlet planning area. Oilspills can impact fish populations by causing short-term acute impacts or long-term sublethal impacts. Since most oil remains at or near the surface, species that are most vulnerable are those that inhabit the surface layer or shallow nearshore at least some time during their life cycle. These species include salmon (adult and juvenile of all five species, and egg and larvae of pink and chum salmon), herring (all life stages), crab (larvae of all species), shrimp (adult), and several species of demersal fish (eggs and larvae).

Salmon: Adult salmon (of all five species) would be vulnerable to oil contamination if a spill contacted areas in or near the mouths of rivers during or preceeding periods when these fish are congregating near these river mouths prior to migrating up river to spawn. Smolt would be susceptable to adverse impacts in the same areas during out-migration or in nearshore areas during their first few months in the marine environment. Pink and chum salmon would be vulnerable during all life stages as these species spawn intertidally to some degree. Vulnerability to any of the five species would vary depending on the timing of their spawning or out-migration of a particular population or run. The five adult species in the planning area exhibit a period of vulnerability (spawning period) of approximately three to four weeks. This period of vulnerability occurs from the months by May to September. Little is known about the movements of juvenile salmon. They make coastwide movements (lateral to shore), feed and grow in the intertidal, and move offshore over a period of several months.

If it is assumed that an oilspill will contact a nearshore area, especially off the mouth of a salmon stream, several impacts could occur. These impacts could be any of a variety of lethal or sublehtal toxic responses, or the loss of fish prey organisms. Adult salmon are highly mobile, and some evidence suggests that this life stage could detect and avoid toxic levels of aromatic hydrocarbons in solution (Weber et. al., 1981). Therefore, the major concern seems to be that these adults would avoid areas of contamination, which if found off the mouths of major spawning rivers could result in delays in spawning runs or actual blockage of the river or stream. Given the fact that oilspills in the marine environment generally result in concentrations less than those which have proven toxic to adult salmon (Malins, 1977), it is quite unlikely that this type of impact would occur. Even if toxic concentrations did occur, these concentrations would not remain long in marine waters, especially off the mouth of major rivers where dilution would occur rapidly.

Salmon smolt on the other hand would perhaps be more vulnerable, in that they would remain in nearshore waters for longer periods while they feed and grow in preparation of movements farther offshore. However, like adult salmon, juveniles appear to possess the ability to detect toxic concentrations of petroleum hydrocarbons (Maynard et al., 1981). If this is the case, then oilspills in the nearshore could possibly be avoided to some degree by this life stage. Additionally, as stated above, toxic concentrations in the range

of concern (5-15 parts per million [Maynard et al., 1981] of aromatic hydrocarbons) would not be expected in marine waters. However, considering that a spill could remain several days or several weeks in coastal waters, portions of a population may be subjected to prolonged stress from sublethal effects.

The eggs and larvae of pink and chum salmon that occur in marine intertidal areas would be the most vulnerable of these earlier life stages. It would be difficult to quantify the impacts to a local salmon fishery from oilspill contamination in a spawning or larval rearing area. However, it is possible that a large portion of eggs and larvae could be lost. The effect of this loss, however, becomes somewhat obscure when one considers that natural mortality of eggs an larvae may be an high as 75 percent for each of these life stages. The difficulty would be in ascertaining what percentage of those lost from oil pollution would have succumbed naturally. It is possible that most of a year class from a local population could be lost. When considering the large annual fluctuations in these species, however, this may not always be significant. Generally though a year the loss of class is not a feasible effect. It can significantly reduce later year population levels.

Given the extremely low number of expected spills, and the narrow periods of vulnerability at least for adult and juvenile salmon, it is unlikely that an oilspill would contact important nearshore areas during the period when salmon are present. The level of impact to a local pink or chum population could be high as a result of oil contacting an important spawning and larval rearing intertidal area. Areas of importance in this discussion of pink and chum salmon include Kamishak and Kachemak Bay in Lower Cook Inlet and the numerous small bays and inlets on the east and west side of Shelikof Strait.

Shellfish: All three species of crab (Tanner, dungeness, and king) have similar life histories in that adults spend the winter months in deep water (150-400 m) and migrate to shallow (6-20 m) waters in the spring and summer to spawn. During this period, the eggs which have been carried by the female since the previous spawning period hatch and become free swimming planktonic larvae.

Distribution of these most sensitive larval forms is generally wide spread, and therefore, would be the most susceptible to contact by an oilspill. The likelihood of such an interaction is high at least once during the life of the field. Even in the case of a very large spill (10,000 barrels or greater) in the Cook Inlet planning area only a small and insignificant percentage of crab larvae would be contacted by concentrations of oil (1-10 ppm) that would cause mortality. The level of impact on crab larvae is then expected to be low for regional populations.

Another effect on crab populations may result from oil sinking to the bottom and contacting aggregations of adult or juvenile crab or by contaminating large areas and affecting their food supply. There is greater opportunity for this phenomena in shallower, nearshore waters where adult and juvenile dungeness crab spend lengthy periods. The likelihood of such an event is somewhat less than that of contact to the larval stages; however, given the broad distribution of crab populations, this contact with adult and juvenile crabs is more likely than with larval stages. The level of impact to these life stages on a regional basis is low. Local dungeness crab populations in

nearshore waters could, however, suffer at least one short-term decline if their habitat is affected.

Scallops would be more sensitive to oil sinking and becoming entrained in the sediments in which they live. This species would be especially vulnerable along the southwestern side of Kodiak Island in Shelikof Strait. These organisms can accumulate certain hydrocarbons very rapidly and tend to retain these compounds for longer periods even after being placed in a clean environment (Malins, 1977), leaving them susceptible to lenthal and variety of sublethal effects. While it is likely that a portion of scallop habitat will be affected the level of impact to the regional population would be low.

Shrimp: Four species of pandalid shrimp (pink, humpy, coonstripe, and spot) exist in the waters of the Cook Inlet planning area. Pink shrimp, however, predominate in the catch. All species are known to inhabit the continental shelf of this region out to depths of around 200 meters. Mating occurs in September in coastal shallows with the eggs carried offshore by the females until they hatch the following March and April. Young shrimp are found in the shallow bays and move into deeper water as they grow. This shallow water period is the time of greatest vulnerability for large numbers of both young and adult shrimp to be contacted by an oilspill. Areas of concern include Kachemak Bay and the east and west side of Shelikof STrait. Areas vital to rearing and reproduction include Kachemak Bay and an area off Cape Gull on the west-side of Shelikof Strait. In the unlikely event that the one expected oilspill contacted either of these two latter areas the level of impacts to local stocks could be high overally, the regional impacts to shrimp would be low.

Herring: Herring are most vulnerable from oilspills as spawning adults, eggs, and larvae, in that these life stages occur almost exclusively in nearshore waters. In May and June herring of this region move into the nearshore areas along the western side of Kodiak Island, Kamishak Bay, and Kachemak Bay to deposit their eggs on vegetation (kelp and eel grass) or rocky substrate. Eggs hatch within a month and larvae spend about two months in nearshore waters prior to changing into juveniles and moving offshore.

Because of the low number of expected spills and the fact that these spawning areas are relatively sheltered bays, it is unlikely that herring would be contracted by an oilspill under this alternative.

If an oilspill did contact one of the spawning areas during the spawning or larval rearing period, it is possible that adverse consequences to the local herring population could occur. These consequences could include egg or larval mortalities, contamination of spawning substrate, loss of organisms upon which larval herring feed, and adult mortalities. It is possible that a year class from the impacted area could be lost as a result of this impact. The extent of these losses would depend on many factors, with the size of spill and size of the affected area being the greatest determinants. It is also possible that only a portion of the spawning population, eggs, or larval herring would be affected in a given area. Given that extreme environmental conditions (i.e., shortage of food supply, storms, etc.) cause extremely high egg and larval mortality (as high as 99 percent for larvae and 60 to 90 percent for eggs (Smith, 1976)), the loss attributable to an oilspill could be extremely small.

Even in the worst case, however, the loss of a local year class would not represent a significant regional impact to the total herring biomass.

Demersal Fish: Demersal species including halibut would probably be less affected by an oilspill than any other species group. The most vulnerable species are those which have egg or larval forms that inhabit surface or nearshore surface waters. Important species in the Cook Inlet planning area which display this characteristics are halibut, ocean perch, English sole, starry flounder, and pollock. Because fish eggs and larvae are relatively sensitive to hydrocarbon contact, and because of the broad distribution of these life stages throughout the region it is likely that the one oilspill would result in a low ecological loss to these species. The level of impact on a regional basis, would be low.

Several types of discharges and effluents could be released during OCS oil and gas activities. OCS Operating Orders prohibit disposal of any waste materials into the ocean that will create conditions which will adversely affect aquatic life. Disposal of waste materials is regulated by the Environmental Protection Agency. Of concern are drilling muds because very little is known about their long-term, chronic impacts. There are indications that these muds could produce elevated trace metal concentrations in marine organisms and interfere with reproductive processes. However, given that only 7 exploratory and 26 production wells are projected for this alternative, a relatively small amount of effluent material would be discharged, (Section V.D.11.a.1.b) and a small demersal area would be affected. Therefore, impacts to fish and shellfish are expected to be very low.

Conclusion. Fish and shellfish that occupy surface and nearshore waters at least some portion of their life history are expected to suffer low ecological losses. Local impacts to pink and chum salmon, and all species crab could be high but would recover rapidly. Overall, regional impacts to fish and shellfish would be low.

Cumulative Impacts. If all tracts in the Cook Inlet planning area are leased and developed during the life of the proposal, the expected number of oilspills is about 3.9 for spills greater than 1,000 barrels and about 1.7 for spills greater than 10,000 barrels. Additionally, the State of Alaska will increase the risk of oilspills by conducting three State lease sales (35, 40 and 45) in the territorial waters of Cook Inlet. Given this small increase in the number of expected spills, the cumulative impacts due to oilspills to the fish resources of this planning area would be moderate. Fish populations are also stressed by commercial fishing pressure, which combined with the cumulative oilspill impact could result in a high ecological loss to certain species (primarily pink salmon and herring) unless management action (i.e., area closures) is taken to relieve the harvest pressure. Overall, the expected regional impacts to fish populations due to the cumulative impacts would be moderate.

In terms of oilspills the contribution of this alternative case would be low. The contribution of this alternative when only the resources described in the alternative are leased (as opposed to total development of OCS resources) would still be low.

(2) Commercial Fisheries: The Cook Inlet planning area comprises one of the most valuable commercial fishing areas in Alaska. In 1979, over 39 million pounds of fish and shellfish worth $28 million to commercial fishermen were landed in this region (Alaska Department of Fish and Game, 1980). This represents about 5 percent of the total Alaska langings. For the purpose of this analysis, a high economic impact on any commercial fishing industry results when there is a ten percent or greater economic loss to that industry. A moderate economic impact results when there is an economic loss of less than ten percent. A low economic loss results when there is a small economic loss to the industry. It should be recommended however, that the loss to individual fishermen probably will be more serious than the loss to industy.

Impacts on commercial fisheries under the proposal would result largely from competition for labor, ocean space use conflicts, competition for infrastructure services, and reduced catch due to ecological loss (as discussed above). This analysis (except for reduced catch) draws largely from Tobolski et. at., (1981), which provides an analysis of fishing industry impacts in the Bering Sea.

Over the life of the proposal, about 0.6 oilspills greater than 1,000 barrels and 0.2 oilspills greater than 10,000 barrels are expected to result from Alternative I-1. Since fish resources are expected to sustain low ecological losses (see discussions in Section V.D.11.a.1. and 2.a[1], the commercial fishing industry could sustain low economic losses because there would be a loss in potential catch. These potential impacts are expected to be short term in duration, and only occur once during the life of the field given the low number of expected spills.

A large oilspill, especially in Kamishak or Kachemak Bay, could impact commercial fishing by causing a disruption in space and time. It is unlikely that commercial fishermen will harvest in the area of an oilspill because 1) their boats and gear may be contaminated; 2) they may be restricted from the contaminated area while clean-up efforts are underway; and 3) direct coating and incorporation of petroleum hydrocarbons can cause tainting of marine organisms, rendering them undesirable or unmarketable. This disruption in fishing would affect the nearshore salmon and shellfish fisheries to a greater degree than the offshore demersal fish fisheries. In the unlikely event that a large oilspill contacted this area during the height of the fishing season (varies by species) a moderate to high impact would result on the local fishery (especially on the salmon fishery). Regional economic impacts, however, would be low.

A large portion of fishery related labor in the region of interest is made up of fishermen whose earnings are lower than may be paid to unskilled workers in the oil and gas industry. This is likely to lead to a high willingness of this labor pool to transfer to OCS employment. However, because the number of jobs to which they would be attracted is limited and because there is a considerable excess in the number of crewman available for fishing jobs, the impact due to labor competition would be very low.

Ocean space use conflicts consists of loss of and damage to fishing gear, loss of access to fishing grounds, and collisions among vessels. Fishing gear conflicts may result from: 1) oil fouling of gear (as stated above), 2)

catching or "hanging" gear (trawl nets or scallop dredges) on obstructions such as pipelines and bulk material inadvertantly discarded by industrial operations, 3) and vessel traffic and seismic operations (trailing long seismic cables) in areas where pot-fishing (crab) and long-line fishing (halibut) occur. Secondary economic impacts from gear conflicts occur from fishing time lost while waiting for repair or replacement of gear. This may be especially acute in these remote areas in Alaska where replacement gear must be shipped from distant suppliers and transportation services are limited.

The analysis of the St. George Basin (Tobolski, 1981) which projected the number of gear damage/loss claims that would be submitted as a result of oil and gas development concluded that there would be 5 claims ($90,000 in 1980 dollars) per year initially increasing to 12 claims ($216,000 in 1980 dollars) per year during full development. These results were based on the estimated future fishing effort and the projected number of oil and gas installations (platforms) with claim frequencies established for these parameters from North Sea historical data. Given that the intensity of fishing and OCS development is anticipated to be greater in the St. George Basin than in the Cook Inlet, the number of claims should be less. Even if the St. George figures are assumed, this would represent a total economic loss of less than .7 percent to the regional fishermen. However, this would represent a very high loss to individual fishermen.

The emplacement of one platform in the planning area would result in a loss of access of fishing grounds in the amount of 78.5 hectares (considering a 500 meter buffer zone for the platform). This represents an insignificant loss to the fishing industry.

Attempts by domestic fishermen to exploit the hitherto foreign dominated demersal fish resources will introduce new vessel traffic in the planning area. Similarly, the OCS supply and support vessels will bring additional traffic leading to increased chances of vessel collisions. This may be especially true in restricted areas such as the entrance to Kachemak Bay. However, the analysis for the St. George (Tobolski, 1981) concluded that only one collision would be expected in 20 years due to increased OCS vessel traffic. Given that OCS development in Cook Inlet will not be as heavy as St. George, it is safe to assume that one vessel collision would be the upper limit for the life of the proposal for the Cook Inlet planning area. Such a collision may render only slight to moderate damage or even a complete loss (sinking) of one or both of the vessels involved. If the latter is the case, especially for a larger vessel (catcher-processor), the impact to the fishing industry could be moderate considering the 20 year life of the field.

The most likely damage, however, would be much less, because most collisions do not involve sinking or major damage. Statistics of casualities in U.S. waters show that the average value lost per vessel involved in a collision is approximately $22,137 (1980 dollars). If a fishing vessel is involved in a collision during the life of the proposal, then the annual loss equivalent would be $1107. The expected level of impact to the fishing industry, therefore, is very low.

Impacts resulting from competition for infrastructure services would likely occur in the vicinity of Homer. In this case competition of these services would not be great. Homer would be able to accommodate the small amount of

such services, and competition between the two industries would be minimal. The expected level of impact from competition for infrastructure services is expected to low.

Conclusion. As a result of the proposal the expected level of impact on the commercial fishing industry in the Cook Inlet planning area is expected to be low. The loss to individual fishermen, however, could be high.

Cumulative Impacts. As previously noted the cumulative impacts on fish resources (salmon, herring, crab) in the Cook Inlet planning area would be moderate. This would result from the increased number of expected spills that result from the leasing in State of Alaska waters. As a result of this moderate ecological loss the fishing industry would be expected to sustain a moderate economic loss.

Because total development of the Cook Inlet OCS would not substantially increase OCS activities, other fishing industry impacts (i.e. competition for infrastructure services, ocean space use conflicts, and competition for labor) would not increase significantly over the impacts of the proposal (as stated above).

The contribution of this alternative to the cumulative case in terms of expected oilspills is low. The contribution of this alternative when only the resources described in the alternative are leased (as opposed to the total development of OCS resources) would still be low.

b) Endangered Species: See discussion under Impacts on Endangered Species in the Gulf of Alaska section.

Conclusion. Since only a small number of endangered cetaceans use the inlet, impacts of development will be low.

Cumulative Impacts. If all potential oil and gas resources of the Cook Inlet planning area are leased and all resources subsequently are developed over the life of the field, the expected number of oilspills is 3.9 spills greater than 1,000 barrels and 1.7 spills greater than 10,000 barrels. An additional unknown quantity of oilspills is expected to result from tankering from Federal OCS lease sale in the Bering and Arctic planning areas. An additional unknown number of oil spills could occur from development of State of Alaska territorial waters in Cook Inlet. Additional projects of activities could contribute to cumulative impacts in the planning area are commercial main traffic. These total projects or activities could affect endangered birds and mannals in the following ways: through oilspills, disturbance, and reducing population levels. The cumulative impacts of these oil spill events, projects and activities are expected to produce a low impact to endangered birds and mammals in the Cook Inlet planning area.

In relation to the case of all resources in the planning area leased and developed, the alternative contributes 15 percent of spills greater that 1,000 barrels and 12 percent of spills greater than 10,000 barrels. These proportions are reduced considerably when the tankering from other Federal OCS planning areas (and State lease sale areas to an unknown extent) are considered. Here oil spills from Cook Inlet leasing contributes little to the total cumulative case. Consequently, the most important causal agent for

potential cumulative impacts on endangered life is tankering from other Federal, State lease sales. The contribution of leasing in Cook Inlet under the alternative to cumulative impacts is very low in the case of only the resources described as developed or all resources leased and developed in planning areas.

c) Habitats and Resources of Special Concern: Large numbers of highly (oilspill) vulnerable seabirds and sea ducks either breed or overwinter in the lower Cook Inlet planning area, while large concentrations of harbor seal, sea lion, and sea otter also occur here. Habitats of particularly special concern for these species include Kupreanof Strait, west Afognak Island, Kachemak Bay, Puale Bay, and the Barrier Islands within this planning area. Adverse impacts of OCS activities from the proposal could come from oil pollution of the marine environment and man-made disturbance.

The species most likely to be significantly affected by potential oilspills as a result of OCS activities in Cook Inlet/Shelikof Strait are diving sea bird species such as murres, auklets, puffins, and sea ducks. Sea otters could also be significantly affected if an oilspill occurs.

Conclusion. Because of the confined area, and the large population of seabirds, sea ducks, sea otters, impacts will be moderate to high from proposed oil and gas development activity.

Cumulative Impacts. If all potential oil and gas resources of the Cook Inlet planning area are leased and developed over the life of the field, the expected number of oilspills is 3.9 spills greater than 1,000 barrels and 1.7 spills greater than 10,000 barrels. An additional unknown quantity of oilspills is expected to result from tankering from Federal OCS lease sale in the 60 planning areas. An additional unknown number of oilspills could occur from development of State of Alaska territorial waters in Cook Inlet (sales 35, 40 and 49). Additional projects of activities could contribute to cumulative impacts in the planning area are commercial fishing, pipelines and transportation from the sale 60 area. These total projects or activities could effect birds in the following ways: through oil spills, disturbance, and reduction of food sources. The cumulative impacts of these oilspill events, projects and activities are expected to produce a high impact to birds in the Cook Inlet planning area.

In relation to the case of all resources in the planning area leased and developed, the alternative contributes 15 percent of spills greater that 1,000 barrels and 12 percent of spills greater than 10,000 barrels. These proportions are reduced considerably when the tankering from other Federal OCS planning areas (and State lease sale areas to an unknown extent) are considered. Here the alternative contributes little to the total cumulative case. Consequently, the most important causal agent for potential cumulation impacts on birds is oil and gas activities in Shelikof Strait portion of Cook Inlet. The contribution of the alternative to cumulative impacts is low in the case of only the resources described as developed or all resources leased and developed in the planning areas.

The most important causal agent for potential cumulative impacts on marine mammals is tankering from other Federal, State lease sales all projects or

activities could affect marine mammals in the following ways; through oilspills, disturbance, and reduction of food sources causing decline in area population levels. The cumulative impacts of these oilspill events, projects and activities are expected to produce a moderate-high impact to marine mammals in the Cook Inlet planning area.

d) Air Quality: A discussion of the primary factors used in assessing onshore air quality impacts which may result from OCS-related activities and the method employed in quantifying the impact on this planning area are described in Section V.A.3 of this document. As is noted at the beginning of the discussion of impacts from development of hydrocarbon resources in the Cook Inlet planning area, all the resources and infrastructure for the South Alaska area were attributed to Cook Inlet for the purpose of analysis. The resources and infrastructure are wholly assigned to each of the four South Alaska areas. Thus, it is estimated that seven exploratory wells will be drilled to identify the resources and 26 development/production wells and one platform to develop the resources under this alternative. It was assumed for the purposes of analysis, that production from this platform would be 3.3 million barrels of oil and 26.7 billion cubic feet of gas per year. All of the oil and gas will be transported to shore via subsea pipeline. Estimated representative emissions for exploration/development are provided in Table V.D.11.a.2)d)-1. This information is derived from Table V.A.3-1.

Table V.D.11.a.2)d)-1. Estimated Representative Emissions

Activity	Production at Platform (tons per year)				
	VOC	NO_X	TSP	SO_2	CO
oil/gas	27	396	--	1.0	150

Offshore OCS facilities located within 20 miles of the shoreline are expected to require emission controls. The one platform associated with the development of resources in Cook Inlet will, in all likelihood, be located within 20 miles of shore and therefore require emission controls. One new gas processing plant may be required as a result of the proposal and may further influence the air quality in the Anchorage area, depending upon the siting of this facility and its relation to the Anchorage air shed. Anchorage is in non-attainment for CO. Siting of a facility in upper Cook Inlet may influence the level of pollutants in Anchorage.

A low (qualitative) impact is expected from routine emissions. The area around Anchorage may experience some impacts as it is in non-attainment for CO. Some effects may be associated with platform siting within 20 miles of the coastline. However, very little activity is associated with the development of resources of resources under this alternative.

If a blowout, oilspill, or fire was to occur near shore, short-term violations of several NAAQs could occur depending on the type and duration of the accident.

Any emission sources which would adversely affect the onshore air quality would be subject to mitigation required by EPA and the State, if located onshore, and

DOI, if located on the OCS. ERG (1981) discusses mitigation measures for OCS facilities.

Conclusions. Overall, the level of expected impacts to air quality due to the proposal is low. The siting of the platform within 20 miles of the coast and the necessity for emissions controls on the platform as well as the proximity to Anchorage are the determining factors for this rating.

Cumulative Impacts. It is estimated that a total of 850 million barrels of oil and gas 5.25 trillion cubic feet exist in the entire South Alaska Federal OCS. In the event that total development of all Federal OCS resources occurs over the life of the proposal, five new platforms with 170 wells would be required. It is unlikely that this development would actually occur over the next 30-35 years. It is also highly unlikely that all of the development would occur in just one of the four South Alaska planning areas. However, for the purpose of analysis it is assumed that total development does occur within this planning area.

The major influencing factors affecting the onshore air quality in the planning area as a result of OCS development are 1) the numbers of new wells drilled, 2) the location of new platforms; 3) the timing of activities; and 4) the instantaneous local meteorological conditions. The development of this proposal contributes moderately to regional OCS cumulative air quality and onshore development (gas processing plants) contributes moderately to the regional and local OCS cumulative air quality impacts.

If the proposed gas processing plant is built very high regional and local cumulative air quality impacts would result. Due to the proximity of geologically favored areas to shore a possible cumulative regional air quality impact may result if several platforms are either clustered near one another or are close to shore.

The increases in oil and gas development described for the proposal will occur at the same time other non-OCS industrial growth takes place in the region. Onshore energy and mineral resource development may contribute to degredation of the local and regional air quality in Cook Inlet. In most cases, OCS activities will be a moderate to minor contributor to the population, industrial growth and associated air quality degredation. The cumulative impact of the overall growth and activity will increase ambient air quality pollutant concentrations. However, no significant change in air quality is anticipated.

Overall cumulative regional air quality impacts are expected to be low; localized impactes will be low. EPA rules associated with the Clean Air Act and the DOI air quality rules have provisions to minimize these impacts.

e) Recreation and Tourism: Adverse impacts on visual, wilderness, and recreation resources would be minor and, in most cases, temporary. Platforms and oilspills would result in visual impacts. Construction activities near wilderness areas would intrude upon the character of these areas. The presence of a service road would alter the wilderness character of the area between Port Lions and Chernof Point. Population increases resulting from OCS activities would result in slightly greater recreational use of wilderness areas and other already heavily used recreation

areas, especially on the Kenai Peninsula. Oilspills could adversely affect recreation resources. (See sale CI and sale 60 FEIS for details on impacts and resources.)

Conclusions. Overall impacts on recreation and tourism from oil and gas development will be moderate, due to the heavy use made of the area for these activities.

Cumulative Impacts. If all areas of the Cook Inlet planning area are and all resources subsequently are developed over the life of the proposal, the expected number of oilspills is 3.9 spills greater than 1,000 barrels and 1.7 spills greater than 10,000 barrels. An additional unknown quantity of oilspills is expected to result from tankering from Federal OCS lease sales in the Kodiak and Shelikof planning areas. An additional unknown number of oilspills could occur from development of State of Alaska territorial waters in Cook Inlet. Additional projects or activities that could contribute to cumulative impacts in the planning area are tankering (State and Federal) platforms, pipelines, coal, and gold port expansion. These total projects or activities could affect recreation and tourism in the following ways: population impacts, looting, oiling of artifacts, and positive impacts such as increased information from surveys. The cumulative impacts of these oilspill events, projects and activities are expected to produce a moderate impact to recreation and tourism in the Kodiak planning area.

In relation to the case of all resources in the planning area leased and developed, the alternative contributes 15 percent of spills greater than 1,000 barrels and 12 percent of spills greater than 10,000 barrels. The proportions are reduced considerably when the tankering from other Federal OCS planning areas (and State lease sale areas to an unknown extent) are considered. Here the alternative contributes low impact to the total cumulative case. Consequently, the most important causal agent for potential cumulative impacts on recreation to cumulative impacts is low in the case of only oil and gas the resources described as developed and is moderate in the case of all resources leased and developed in the planned areas.

f) Socioeconomic Factors: The Cook Inlet area is one of four OCS planning areas within the large South Alaska region. (The other three are the Gulf of Alaska area, the Kodiak area, and the Shumagin area.) Although the probability of the discovery of commercial quantities of petroleum somewhere within the South Alaska region is considered virtually a certainty, no information is presently available concerning the probabilities of commercial discoveries in the individual OCS planning areas within the South Alaska region. There also are no estimates available for the quantities of oil and gas expected from discoveries in the individual OCS areas, although estimates have been prepared for the South Alaska region as a whole. Consequently, employment and population impacts can be estimated for the South Alaska region, but not for the component areas. Within the South Alaska region, the discoveries expected to result from the proposed 5-year leasing program are 130 million barrels of oil and 0.75 trillion cubic feet of natural gas.

Most petroleum workers who develop oil and gas resources within the South Alaska region would live in dormitories during work periods, and during rest periods would commute to residences in Anchorage. This would be true for

petroleum developments in any of the four OCS planning areas within the South Alaska region. The long-term statewide employment impact of petroleum discoveries in the South Alaska region resulting from the proposed 5-year leasing program would probably be about 300 additional jobs, including all direct and indirect employment effects. The corresponding population impact would be about 600 additional permanent residents of Alaska. Almost all of the resident population impact would probably occur in Anchorage.

Conclusions. Even with a commercial discovery, most of the impacts would occur in the form of 600 additional people in the State, mostly in Anchorage, which could handle the increase. Since the area is well developed, economic effects would be low.

Cumulative Impacts. If all areas of the Cook Inlet planning area are leased and all resources subsequently are developed over the life of the proposal, the total cumulative impacts on resident employment and population in the adjacent land area (Anchorage, and Kenai-Cook Inlet census division) during the years 1980 - 2000 would probably be high in the sense that potentially significant short-term and minor long-term stress would be imposed on public and private services and facilities. These cumulative impacts included all anticipated non-OCS activities as well as all OCS activities, in this planning area or in other planning areas, which are expected to have employment or population impacts in the land area adjacent to the Cook Inlet OCS planning area.

Non-OCS activities are expected to generate more than half of the cumulative employment and population gains. A major non-OCS development expected during the years 1983 to 1990 is construction of a gas pipeline from Alaska's Arctic North Slope. The City of Anchorage would serve as one of the major centers of operation for this extremely large construction project. Other factors contributing to economic and population growth include expansion of Alaska's fishing and tourism industries, non-OCS onshore and nearshore oil and gas development, and possible hard minerals development.

OCS activities in other planning areas would also induce very sizable employment and population increases in the Anchorage and the Kenai-Cook Inlet census divisions. OCS developments in remote areas of Alaska are usually carried out by workers who live in isolated dormitories during work periods and commute during frequent rest periods to permanent residences in areas far removed from their work sites. Most of these commuters reside in Anchorage, and have their economic impacts in the Anchorage area. The combined effects of all OCS activities in other planning areas could contribute as much as one-third of the cumulative employment and population impacts expected in the Anchorage and Kenai-Cook Inlet census divisions.

The impact of the proposal on the resident employment and population would be very low in the sense that no significant stress would be imposed on public or private services and facilities in the Anchorage or Kenai-Cook Inlet census divisions. This would be true either at the mean expected resource development level or in the unlikely event of total development of all area resources.

g) Native Subsistence Cultures: An extensive analysis of impacts on village sociocultural systems and subsistence orientations is contained in the FEIS for OCS Lease Sale 60 in the Cook Inlet and the Shelikof Strait. The planning area encompasses the Aleut villages of

Karluk, Larsen Bay and Port Lions on Kodiak Island and English Bay and Port Graham on the Kenai Peninsula of Lower Cook Inlet. Recent population data are available only for the incorporated places of Larsen Bay and Port Lions, which had populations in 1980 of 168 and 215 respectively, with roughly 70 percent being Aleut people. The population of the other villages is estimated at 100-200 persons each, mostly of Aleut descent, for a total native population of approximately 500-600 persons.

These relatively isolated Aleut settlements have long maintained a distinctive Aleut-Russian culture and way of life that they value highly and want to maintain. Activities in villages generally are organized around annual subsistence harvest cycles oriented to marine resources, events and obligations of the Russian Orthodox Church, and seasonal commercial fishing, primarily for salmon. Port Graham, Laren Bay, and Port Lions are more fully involved with commercial fishing than the others, having onshore or floating processing facilities; whereas traditional Alaskan subsistence lifeways are evident elsewhere among segments of the populations of larger urban communities and scattered family units.

Direct impacts on the villages from population growth associated with the proposal are unlikely, considering the existing industrial and urban infrastructure in developed parts of the planning area will most likely be used. Location of processing or other facilities within or near one of the villages could have major lifeways and sociocultural consequences, such as could result from the doubling of a community rate of growth, as was examined for the case of Port Lions in the Lease Sale 60 FEIS; but the likelihood of such an occurrence is low for the reasons previously stated. Indirect effects on village systems of organization, such as the disruption derived from being deprived of needed mechanical, construction or hunting and fishing skills through the out-migration of key individuals for oil industry employment, could take place, but perhaps not to any greater extent than has occurred periodically in the past as job opportunities not available in the villages have become available elsewhere on a limited duration basis.

Disruption in the access to or availability of, local marine subsistence resources, especially salmon, seal, and beach organisms, from the effects of localized oilspill events could have major impact on village sociocultural systems. The statistically derived mean number of spills equal to or greater than 1,000 barrels is 0.6 for the planning area. The comparable statistic for spills of equal to or greater than 10,000 barrels is 0.2. Considering the confined geography of the planning area, there is a likely chance that spills could reach shore. Should such an event occur at locations critical to specific marine resources used locally or within the immediate vicinity of subsistence villages, where beaches, lagoons and wetlands are intensively used for subsistence resource harvest, then the possibility exists for direct and indirect impacts to be realized.

Such direct and indirect consequences at the village level could include restricted local hunting and fishing, for a duration consistent with the damage incurred; social and cultural stress associated with the shortage of customary and traditional resources in the places they usually are found; increased cost in time and money to replace lost resources, assuming local transportation means were suitable for using an extended harvest range; and problems of food distribution and local storage should crisis-oriented replacement programs be

initiated. The small number of spills expected over the life of the proposal reduces the likelihood of such impacts occurring, although the confined geography of the planning area almost assures shoreline contact with such an occurrance.

Conclusion. Impacts on native subsistence cultures in the planning area are expected to be moderate by virtue of the confined geography of the planning area combined with the low likelihood of oilspills events and the centering of OCS-related population within the existing urban setting.

Cumulative Impacts. If all areas of the Cook Inlet planning area are leased and all resources subsequently are developed over the life of the proposal, the expected number of oilspills is 3.9 spills greater than 1,000 barrels and 1.7 spills greater than 10,000 barrels. An additional unknown quantity of oilspills is expected to result from offshore activities and tankering from the Federal OCS leased areas of sales CI, 60 and Reoffering Sale 2 in the planning area. An additional unknown number of oilspills also could occur from development of State of Alaska territorial waters in Cook Inlet. Additional projects or activities that could contribute to cumulative impacts in the planning area are the proposal itself in terms of employment and population growth in Anchorage and increased oil and gas processing facilities in the Cook Inlet region as well as mineral and agricultural projects in the region. These total projects or activities could effect Native subsistence cultures in the following ways. Oilspill damage or other disturbances to local subsistence resources could divert, displace or reduce the availability of subsistence resources. Major disruption in the access to or availability of local subsistence resources where they were traditionally found could disrupt traditional subsistence effort patterns to an extent as to reduce subsistence catch of the resources customarily used, prevent the pursuit of subsistence practices by segments of the population due to the costs of using an increased subsistence range, disrupt traditional (cultural and spiritual) patterns of obligation fulfillment for kinship-based assistance networks and care of the elderly (as examples), and induce chronic stress and anxiety over imbalances in nature, the fear of further changes in such relationships, and the inability to do anything about it. Impacts from such effects could include increased disease, malnutrition and mental disorders, family breakup and conflict, substance abuse and generational conflict. Localized impacts could be magnified within the region through the breakdown of customary inter-village (through family networks) resource distribution patterns and obligations. The cumulative impacts of these oilspill events, projects and activities are expected to produce a moderate impact to Native subsistence cultures in the Cook Inlet planning area.

In relation to the case of all resources in the planning area leased and developed, the alternative contributes 15 percent of spills greater than 1,000 barrels and 12 percent of spills greater than 10,000 barrels. These proportions are reduced significantly when the offshore activities tankering from the Federal OCS lease areas (and State lease sale areas to an unknown extent) in the regions are considered. Here the alternative contributes marginally to the total cumulative case. Consequently, the most important causal agent for potential cumulative impacts on Native subsistence cultures is other oil and gas operations in the confined areas of Cook Inlet.

The contribution of the alternative to cumulative impacts is marginal in either case of only the resources described as developed or all resources leased and developed in the planning area.

3) Impacts on Other Management Plans: The jurisdiction that would be impacted by this sale are the Kodiak Island, Kenai Peninsula, Matanuska-Susitna and Anchorage Boroughs. All of the above mentioned have local coastal programs in progress, and Anchorage had its program approved in 1980. The other three should be through the approval process by the time of a South Alaska sale. The regulatory provisions of the ACMP, which require accommodation of oil and gas facilities, apply in any case.

Marine Sanctuaries: Cook Inlet has been nominated as a marine sanctuary, but has received no further consideration.

4) Unavoidable Adverse Impacts: Oilspills, discharges of drilling effluents (muds, cuttings, and formation waters) and sewage disposal would result in unavoidable adverse impacts to water quality under the proposal. Impacts from all of the above except oilspills could be mitigated by EPA NPDES regulations.

Water supply would be unavoidably adversely affected by this proposal. Limited supplies would be consumed by OCS-related infrastructure and development, creating demands on supplies of unknown quantity.

The unavoidable adverse impact for land use would be a reduction in the amount of land available for other uses. Occupation of land by OCS-related activities and structures would be minimal.

Coastal ecosystems would be unavoidably adversely affected by oilspills and various discharges as mentioned above for water quality. The level of impact would be restricted both geographically and temporally.

The proposal would have unavoidable adverse impacts on fish by oilspills contacting nearshore habitats or eggs and larvae which occur on or near the surface. Oilspills would also affect commercial fishermen by reducing the number of harvestable fish. These impacts are expected to be minimal.

Birds, marine mammals and endangered species would also suffer unavoidable adverse impacts from oilspills. The level of impact would depend on when and where the oilspill occurred.

Recreation and tourism resources could be adversely effected unavoidably by damage to visual resources through the intrusion of onshore support infrastructure and road systems, nearshore systems of causeways, pipelines and drilling islands, offshore oil and gas platforms, and vessel and aircraft traffic supporting such operations. Such effects would be localized and may serve as an attraction to a segment of the recreation and tourism population.

Cultural resources offshore, such as housepits, burins, scrapers, arrowheads, and other artifacts, could be unavoidably destroyed through OCS operations, but the great dynamics of the marine environment already may have resulted in the destruction of many of these resources. Cultural resources located onshore

could be lost or damaged by public pilfering or indiscriminate exposure of artifact sites.

Introduction of urban and industrial land uses, except for regional urban centers, would change the character of isolated, de facto wilderness areas, but impacts would be isolated and small in relation to the total area involved. Where urban centers are involved, land use demands generated by OCS activities could unavoidably produce adverse effects derived from the rate and relative scale of demand. Land speculation and price inflation could be experienced as well as interruption in community facilities and infrastructure during the period necessary for such aspects of land development to catch up with increased land use demands.

Native subsistence cultures could be adversely affected directly in an unavoidable way through accidental oilspills and an increase in population, causal agents which could affect the access to and availability of subsistence resources. Such impacts have been discussed previously. Perhaps more insidious are the indirect adverse effects which could be caused unavoidably by the nature of kinship-based social networks existing between regional centers and villages and the periodicity of urban-village migration customary in village regions. Localized effects in villages could have adverse effects throughout the village region. Disruption of customary urban-village migration patterns, through effects such as urban housing shortages, price inflation or reduced supply of public services, could cause hardship for those segments of the population unable or willing to adapt to such changes and contribute to social disorder and disorientation of cultural value systems.

5) Relationship Between Local Short Term Uses and Maintenance and Enchancement of Long -Term Productivity: In this section, the short-term effects and uses of various components of the environment are related to long-term effects and the maintenance and enhancement of long-term productivity. The effects of the alternative would vary in kind, intensity, and duration, beginning with preparatory activities (seismic data collection and exploration drilling) of oil and gas development, and ending when natural environmental balances might be restored.

Biological productivity would be lost in short-term on all onshore lands used in the proposed project. These areas could be returned to productivity in the long-term with proper management. Restoration may not be entirely feasible; however, the overall loss would be a minor adverse effect. The direct land requirements would show in both the short-term and the long-term because of disturbance. Major construction projects would cause definite changes in both the short-term and long-term. Some species may have difficulty repopulating and could be displaced.

Short-term oil pollution and the possibility of long-term cumulative oil pollution impacts could cause serious adverse effects on all components of the marine ecosystems, including fisheries. While restoration would allow fisheries production to regain original levels, any reduced annual harvests during the life of the project would be irretrievably lost. The extent is not known presently, but the potential must be recognized.

Freshwater pollution from onshore activities is a short-term effect. The long-term decrease in water quality may be considered to be a tradeoff for obtaining oil and gas resources.

The biota would be threatened in the short-term by potential oil pollution. Direct mortality could be significant through the combined effects of harassment by humans and the increased volume and frequency of noise from vessel traffic or overflying aircraft. In the long-term, such disturbanes could alter behavior patterns and could drive fauna away from traditional feeding and breeding grounds or to other critical areas within their range, reducing species populations over a long period of time.

6) Irreversible and Irretrievable Commitment of Resources

a) Minerals Resources: Resources discovered would be irretrievably consumed.

b) Biological Resources: Commercial fishery losses may occur principally by oilspills interfering with salmonid migrations or by their direct contact with larval fishes and/or their planktonic food supplies. Any losses of commercial fishing incomes attributable to this alternative would be irreversible and irretrievable to the extent they were uncompensated. Unharvested commercial finfish and shellfish, as renewable resources, would be irretrievably lost to the economy.

Increased air and ship traffic and onshore activities, as well as potential habitat degradation or reduction in available food resulting from oil and gas industry operations could displace birds and mammals into less favorable environments, ultimately resulting in reduced population levels. Displacement could become irretrievable if permanent alterations of the environment are maintained by such activities.

c) Endangered Species: Under the alternative, it is possible that endangered whales could be subjected to irreversible direct and indirect effects of oilspills, disturbance due to noise and other human activities, or losses and/or deterioration of habitat due to facility developments. Whether such effects would lead to permanent (irreversible) losses of whale resources is unknown.

d) Social Systems: Village subsistence practices could be affected irreversibly by the displacement of subsistence resources from locally used customary habitat or by the reduction of resources through the modification of favorable habitat. The displacement could be irretrievable if the effect were maintained over time. Irreversible changes in cultural values and orientations could occur from the proposal, but the irretrievable nature of these changes to sociocultural system is unknown.

A high growth situation could cause increased housing costs and shortages and could place extreme demands on utility services such as electrical power, water, sewage, and solid waste disposal. Attempts to provide basic service levels for the above items to meet increased population levels could force communities to forego improvements to the existing services.

THE MORE SIGNIFICANT ENVIRONMENTAL CONSEQUENCES

Cook Inlet

Resource Category	Level of Expected Impacts* Scheduled Sales Only Under Alternative I-1	Cumulative Impacts of All Activities
1. General Impacts		
a. Coastal Ecosystems	low	moderate
b. Water Quality and Supply		
Water Quality	low	low
Water Supply	high	high
c. Navigation and Shipping	low	low
d. Other Uses of the OCS	n/a	n/a
e. Land Use	low	low to moderate
f. Cultural Resources	low to moderate	moderate
2. Impacts of Special Concern		
a. Fish and Commercial Fisheries		
Fish Resources	low	moderate
Commercial Fisheries	low	moderate
b. Endangered Species	low	low
c. Habitats and Resources of Special Concern		
Birds	moderate to high	high
Mammals	moderate to high	moderate to high
d. Air Quality	low	moderate
e. Recreation and Tourism	moderate	moderate
f. Socioeconomic Factors	low	high
g. Native Subsistence Cultures	moderate	moderate

* Definitions of level of impact are provided at the beginning of Section V.D.

(This table also applies to Alternative I-2, II, IV-1, and IV-2. See text.)

Due to the increase in air and marine traffic generated by this alternative and, importantly, the severely inclement weather to which the area is prone, it is highly probable that there would be an increase in transportation related fatalities over the life of the proposal.

e) Economic Systems: The only commitment that could be considered possibly irreversible and irretrievable would be the economic risk, resulting from OCS activity, of destruction of commercial fisheries resources or destruction or other fauna or flora used for subsistence by area residents.

b. Alternative I-2

Resource estimates and attendant activities, and oilspill probabilities are the same for this alternative as for Alternative I-1. This being the case, impacts resulting from this alternative would be the same as those described for Alternative I-1. In addition, impacts on other management plans and unavoidable adverse impacts would te the same as described for Alternative I-1. The relationship between short-term use of man's environment and long-term productivity for this alternative is the same as that described for Alternative I-1. The irreversible and irretrievable commitment of resources associated with this alternative is the same as described for Alternative I-1.

c. Alternative II

Resource estimates and attendant activities, and oilspill probabilities in the Cook Inlet planning area are the same for this alternative as for Alternative I-1. This being the case, impacts resulting from this alternative would be the same as those described for Alternative I-1. Likewise, because other projects and proposals that are assumed for the cumulative case for Alternative I-1 are also assumed for this alternative, cumulative impacts would be the same as for Alternative I-1. Impacts on other management plans and unavoidable adverse impacts would be the same as described for Alternative I-1. The relationship between short-term use of man's environment and long-term productivity for this alternative is the same as that described for Alternative I-1. The irreversible and irretrievable commitment of resources associated with this alternative is the same as described for Alternative I-1.

d. Alternative III-1

Discussion of general impacts, impacts of special concern, other management plans, unavoidable adverse impacts, relationship between short-term use of man's environment and long-term productivity, and irreversible and irretrievable commitment of resources is not necessary as no resources would be leased in the Cook Inlet under this alternative. This alternative would cause no impacts.

e. Alternative III-2

Resource estimates, and attendant activities, and oilspill probabilities are the same for this alternative as for Alternative III-1. This discussion of general impacts, impacts of special concern, other management plans, unavoidable adverse impacts, relationship between short-term use of

THE MORE SIGNIFICANT ENVIRONMENTAL CONSEQUENCES

Cook Inlet

Resource Category	Level of Expected Impacts* Scheduled Sales Only Under Alternative III-1	Cumulative Impacts of All Activities
1. General Impacts		
a. Coastal Ecosystems	n/a**	moderate
b. Water Quality and Supply		
Water Quality	n/a**	low
Water Supply	n/a**	high
c. Navigation and Shipping	n/a**	low
d. Other Uses of the OCS	n/a	n/a
e. Land Use	n/a**	low to moderate
f. Cultural Resources	n/a**	moderate
2. Impacts of Special Concern		
a. Fish and Commercial Fisheries		
Fish Resources	n/a**	moderate
Commercial Fisheries	n/a**	moderate
b. Endangered Species	n/a**	low
c. Habitats and Resources of Special Concern		
Birds	n/a**	high
Mammals	n/a**	moderate to high
d. Air Quality	n/a**	moderate
e. Recreation and Tourism	n/a**	moderate
f. Socioeconomic Factors	n/a**	high
g. Native Subsistence Cultures	n/a**	moderate

* Definitions of level of impact are provided at the beginning of Section V.D.

** Differs from the proposal.

THE MORE SIGNIFICANT ENVIRONMENTAL CONSEQUENCES

Cook Inlet

Resource Category	Level of Expected Impacts* Scheduled Sales Only Under Alternative III-2	Cumulative Impacts of All Activities
1. General Impacts		
a. Coastal Ecosystems	n/a**	moderate
b. Water Quality and Supply		
Water Quality	n/a**	low
Water Supply	n/a**	high
c. Navigation and Shipping	n/a**	low
d. Other Uses of the OCS	n/a	n/a
e. Land Use	n/a**	low to moderate
f. Cultural Resources	n/a**	moderate
2. Impacts of Special Concern		
a. Fish and Commercial Fisheries		
Fish Resources	n/a**	moderate
Commercial Fisheries	n/a**	moderate
b. Endangered Species	n/a**	low
c. Habitats and Resources of Special Concern		
Birds	n/a**	high
Mammals	n/a**	moderate to high
d. Air Quality	n/a**	moderate
e. Recreation and Tourism	n/a**	moderate
f. Socioeconomic Factors	n/a**	high
g. Native Subsistence Cultures	n/a**	moderate

* Definitions of level of impact are provided at the beginning of Section V.D.

** Differs from the proposal.

man's environment, and long-term productivity, and irreversible and irretrievable commitment of resources is not necessary as no resources would be leased in the Cook Inlet area under this alternative. This alternative would cause no impacts.

The only impacts would come from other projects and proposals and tankering of oil from other proposed OCS areas. Cumulative impacts would be very similar to those described for Alternative I-1, because the projects considered and the resource amounts estimated to be tankered from other OCS areas are insignificantly different than those considered for Alternative I-1.

f. Alternative IV-1.a

Resource estimates and attendant activities, and oilspill probabilities for this alternative are insignificantly different from those described for Alternative I-1. This being the case, impacts resulting from this alternative would be the same as those described for Alternative I-1. For the cumulative case for this alternative, the number of oilspills associated with tankering of oil from other OCS planning areas would be insignificantly different from Alternative I-1. In addition all other projects assumed for the cumulative impact analysis for Alternative I-1 are the same for this alternative. Thus, cumulative impacts for this alternative would be the same as those described for Alternative I-1. Impacts on other management plans and unavoidable adverse impacts would be the same as described for Alternative I-1. The relationship between short-term use of man's environment and long-term productivity for this alternative is the same as that described for Alternative I-1. The irreversible and irretrievable commitment of resources associated with this alternative is the same as described for Alternative I-1.

g. Alternative IV-b.1.b.

Resource estimates and attendant activities, and oilspill probabilities for this alternative are insignificantly different from those described for Alternative I-1 (and are the same as those described for Alternative IV-1.a.). This being the case, impacts resulting from this alternative would be the same as those described for Alternative I-1. For the cumulative case for this alternative, the number of oilspills associated with tankering of oil from other OCS planning areas would be insignificantly different from Alternative I-1. In addition all other projects assumed for the cumulative impact analysis for Alternative I-1 are the same for this alternative. Thus, cumulative impacts for this alternative would be the same as those described for Alternative I-1. Impacts on other management plans and unavoidable adverse impacts would be the same as described for Alternative I-1. The relationship between short-term use of man's environment and long-term productivity for this alternative is the same as that described for Alternative I-1. The irreversible and irretrievable commitment of resources associated with this alternative is the same as described for Alternative I-1.

h. Alternative IV-2.a.

Resource estimates and attendant activities, and oilspill probabilities for this alternative are insignificantly different from those described for Alternative I-1. Impacts on other management plans and unavoidable adverse impacts would be the same as described for Alternative I-1.

For the cumulative case for this alternative, the number of oilspills associated with tankering of oil from other OCS planning areas would be insignificantly different from Alternative I-1. Impacts on other management plans and unavoidable adverse impacts would be the same as described for Alternative I-1. The relationship between short-term use of man's environment and long-term productivity for this alternative is the same as that described for Alternative I-1. The irreversible and irretrievable commitment of resources associated with this alternative is the same as described for Alternative I-1.

i. Alternative IV-2.b.

Resource estimates and attendant activities, and oilspill probabilities for this alternative are insignificantly different from those described for Alternative I-1 (and are the same as for Alternative IV-2.a.). Thus, impacts resulting from this alternative would be the same as those described for Alternative I-1. For the cumulative case for this alternative, the number of oilspills associated with tankering of oil from other OCS planning areas would be insignificantly different from Alternative I-1. Impacts on other management and plans unavoidable adverse impacts would be the same as described for Alternative I-1. The relationship between short-term use of man's environment and long-term productivity for this alternative is the same as that described for Alternative I-1. The irreversible and irretrievable commitment of resources associated with this alternative is the same as described for Alternative I-1.

12. Shumagin

a. Alternative I-1

1) General Impacts

a) Coastal Ecosystems: The Shumagin planning area is adjacent to a virtually undeveloped segment of the Alaska Peninsula characterized by significant concentrations of nesting and feeding birds and marine mammals. The Semidi Islands are designated as a national wildlife refuge (NWR), as is Simeanof Island in the Shumagin. Many of the smaller islands and rocks were included under ANILCA in the Alaska Maritime NWR, and the entire coastal area is included in the Alaska Peninsula NWR. Birds and mammals inhabiting this area could be adversely impacted from oil contamination of marine waters and contamination of primary food sources. In addition, disturbance may result from vessel and aircraft traffic in the area depending on location of leases. Impacts to these resources are discussed in Sections V.D.12.a.2)b) and c).

The area also has salmon and bottomfish. For impacts on sensitive fish area, see the discussion under the Section V.D.12.c.2)a).

Coastal Habitats: Over the life of the proposal, 0.6 oilspills greater than 1,000 barrels and 0.2 oilspills greater than 10,000 barrels are expected to result from Alternative I-1 South Alaska Sales. For the sake of this analysis all the South Alaska sales resource estimates and resultant development are assumed to occur in the Shumagin planning area. Given this low number of expected spills and the sheltered nature of the Shumagin coastline (long series of heavily indented bays) it is unlikely that large areas would be contacted by an oilspill over the life of the proposal. Therefore, the regional impacts to these habitats are expected to be low. However, it is probable that at least one spill may contact some portion of the coastline and produce a localized effect.

Conclusions. The overall effects of oil and gas activities in this planning area will be low because oilspill projections are low. However, untimely oilspill would effect hauling out grounds, rocky beaches, kelp beds or wetlands along the south side of the Alaska Peninsula.

Cumulative Impacts. If all areas of the Shumagin planning area are leased and all resources subsequently developed the expected number of oilspills is 3.9 spills greater than 1,000 barrels and 1.7 spills greater than 10,000 barrels. In addition an unknown number of oilspills are expected to result from tankering from Federal OCS lease sales in the Barrow Arch, Hope, Norton, Navarin, St. George and North Aleutian planning areas, from development and tankering of State of Alaska territorial waters in Hope Basin, Norton Basin, and Bristol Bay Uplands, and from tankering of Canadian Beaufort crude. These total projects or activities would effect coastal ecosystems by substantially increasing the oilspill risk to these habitats. The cumulative impacts of these oilspill events are expected to produce a moderate impact to coastal ecosystems in the Shumagin planning area.

In relation to the unlikely case of all resources in the planning area leased and developed, the alternative contributes about 15 percent of spills greater than 1,000 barrels and about 12 percent of spills greater than 10,000 barrels.

These proportions are substantially lower when the tankering from other Federal OCS planning areas, state lease sale areas (to an unknown extent), and Canadian Beaufort crude are considered. The most important causal agent for potential cumulative impacts on coastal ecosystems is tankering oil from Federal and State leases through the area. The contribution of the alternative to cumulative impacts is minor in either the case of only the resources described as developed or all resources leased and developed in the planning area.

b) Water Quality and Supply

Water Quality: Expected onshore enclave water quality impacts are similar to those discussed for the Gulf of Alaska under the proposal.

Offshore water quality of the Shumagin planning area is pristine. Impacts will be very similar to those for Gulf of Alaska planning unit. If commercial quantities of gas and oil are found, 130 million barrels of formation waters would be produced. During the years of exploratory and developmental drilling 8250 cubic yards of drill cuttings and 24,750 barrels of mud cuttings would be discharged. These latter discharges would measureably decrease water clarity over 0.01 percent of the planning area. If formation waters are discharged rather than reinjected, they could release dissolved hydrocarbon content to Shumagin waters equivalent to 33,000 barrels of oil over the life of the field. The projected oillspill rate is identical to that for the Gulf of Alaska. In the absence of a major spill offshore petroleum development would result in slight, chronic oiling of Shumagin waters and loss of water clarity near permanent structures.

Water Supply: Water supply facilities in the Shumagin area are, at best, limited or are non-existent at many locations. Service facilities and housing for OCS development are assumed to be enclaved on the south side of the Alaska peninsula. New water supplies will be developed which would tax existing water supplies, i.e. local streams, reservoirs, etc. as the area is undeveloped. Existing populations will be affected. Consequenlty the impact is relatively high.

Conclusions. The affects on water quality from OCS activity in this area will be low, except in the immediate vicinity of platforms. There are few developed water systems to support OCS activity, so new water supplies would have to be developed. Thus, a very high impact is expected for the area water supply.

Cumulative Impacts. In the unlikely event that all potential oil and gas resources of the Shumagin planning area are leased and subsequently developed in a timely manner, the expected number of oilspills is 3.9 spills of 1,000 barrels or more with 1.7 spills of at least 10,000 barrels. An additional unknown quantity of oilspills is expected to result from tankering from federal OCS lease sales in North Aleutian Basin, St. George Basin, Navarin Basin and Norton Basin planning areas. An additional unknown number of oilspills would occur from development of State of Alaska onshore and offshore reserves in Hope Basin, Bristol Bay uplands, and Norton Basin areas and from development of Native Corporation onshore reserves near the Barrow Arch and North Aleutian areas. Oil industry development of all gas and oil reserves in the Shumagin planning area would result in discharge of 52,500 cubic yards of drill cuttings and 157,500 barrels of drilling mud during drilling phases. Formation waters produced would total 850 million barrels over the life of the field.

Additional projects or activities that would contribute to cumulative impacts in the planning area are increased commercial traffic and fishing activity. These projects and activities would effect water quality mostly by inputing fish wastes and increasing risk of fuel spills. The cumulative impacts of these oilspill events, discharges, and additional traffic are expected to produce a moderate impact to water quality in the planning area.

In relation to the unlikely case of all resources in the planning area leased and developed, this alternative contributes 15 percent of spills of 1,000 barrels or more and 12 percent of spills of at least 10,000 barrels. The proposal in the Shumagin planning area provides 25 percent of cumulative impact from drill cuttings, 13 percent of the impact from drilling mud, and 32 percent of the impact from formation waters. The greatest threat to Shumagin water quality is from oil pollution.

The percentage of cumulative impact from oil pollution due to development within the Shumagin planning area portion of the alternative is slightly lower when tankering from other Federal OCS planning areas, and state and Native Corporation leases are considered. The Shumagin planning area in this alternative contributes very slightly to the total cumulative planning area case. The most important causal agent for potential cumulative impact on water quality is oil pollution from cumulative Federal OCS leasing in the planning area. The contribution of the proposal to the cumulative impacts in the Shumagin planning area is considered siginficant when only the resources described for this alternative are developed. The contribution of the proposal to the cumulative impacts is considered insignficant however, when all resources in the planning area are developed.

New water facilities are needed to serve the oil and gas industry needs in the Shumagin planning area. The area may also be the host service support facilities for development in St. George and North Aleutian planning areas. In addition, increase in the commercial fishing industry in the area and other commercial activities will require additonal water supplies to be developed. The sum effect of this activity results in a very high impact to water supply.

The proposal, including expected resource development from the Shumagin, St. George, and North Aleutian planning areas (and total development of hydrocarbons in these areas), is the primary contributor to demands on (and impacts to) water supply in the area.

c) Navigation: The Shumagin planning unit is an area of marginal resource value. This fact coupled with the areas' intermittant fishing vessel traffic, indicates a situation in which oil exploratory and developmental activities would have little impact on the navigability of the subject waters.

Conclusions. Impacts to navigation are expected to be very low.

Cumulative Impacts: Shumagin planning unit traffic is currently comprised almost entirely of fishing vessel traffic. Future traffic, however, would contain large numbers of tankers passing to and from the proposed lease sales in the Hope, Norton, Navarin, St. George, and North Aleutian planning units as well as state of Alaska proposed lease Sales 41, 38, and 45 and from the

Canadian Beaufort. An oil terminal port located on the south side of the Alaska Peninsula will also add traffic to the Shumagin area.

Given the sparse resource estimates as well as low infrastructure requirements, it is unlikely that development of either cumulative or mean case Shumagin resources, would result in more than 2 percent of the total traffic volume of the area. The proposal's impacts to the navigation systems of this planning unit are expected to be low.

d) Other Uses of the OCS: The main use of the OCS in this area is fishing, which is addressed below.

e) Land Use: This area is virtually undeveloped. Exploration and production activities may be supported from areas with existing infrastructure, such as Kodiak or Cold Bay or a new enclave may be established in the region to support activity. The area is very rugged, and mainly in refuge status due to ANILCA.

Conclusions. Since this area is virtually undeveloped, impacts on existing land use would be low. Developing new facilities in the area will cause some localized land use changes.

Cumulative Impacts. The project that will most affect land use in the Shumagin area is the Bristol Bay Cooperative Land Use Management Plan. It should affect land use in the following ways: Alaska Peninsula land ownership and use patterns will largely be dictated by the outcome of this plan; it will establish transporation corridors, resource zones and industrial areas, etc.; and it will also clearly define and resolve ownership conflicts between various public and private agencies. It is expected that additional land use impacts because of oil and gas development would affect 150 acres of land, because of the need for a small oil and gas processing facility, airport facilities, living quarters, warehouses, a small material support facility and a small docking facility. OCS development would result in very minor (low) changes in land use. The area is relatively unpopulated. In consideration of the acreage involved, the changes would be insignificant.

Considering its present wilderness state, development from OCS activities will generate an insignificant impact.

f) Cultural Resources: There are numerous archaeological and other cultural sites in the Shumagin planning area which would be subjected to impact.

The Shumagin Islands lie in USGS quadrants of Port Moller, Shumagin Island, and Stepovak Bay. The shores of the Alaska Peninsula also within these three quadrants, have many archaeological sites that could be affected by beach impacts of oil or population impacts. An estimated 10 to 15 known sites of the over 37 listed in the Alaska Heritage Resources File would likely be impacted.

Historical marine resources such as the following ships which went down in the Shumagin Islands may be impacted: Schooner General Miller, 1882; Schooner H.L. Tierman, 1882; Schooner Wild Gazelle, 1983; Schooner Isabelle, 1888; Schooner John Hancock, 1893; Schooner Pearl, 1905; Schooner Nellie Coleman, 1905. Probable impacts to resources such as those described in the general impacts

section could occur when pipeline is laid to onshore facilities, or exploration rigs and production platforms are emplaced.

Conclusions. Impacts on offshore cultural resources would be low to moderate, as several shipwrecks are found in the area. Impacts to onshore sites would be very high as there are numerous known and suspected sites adjacent to the area. Overall, the level of expected impacts to cultural resources is very high.

Cumulative Impacts. In the unlikely event that all areas of the Shumagin planning area are leased and all resources subsequently are devoloped over the life of the proposal, the expected number of oilspills is 3.9 spills greater than 1,000 barrels and 1.7 spills greater than 10,000 barrels. An additional unknown quantity of oilspills is expected to result from tankering from Federal OCS lease sales in the Kodiak, North Aleutian, and St. George. An additional unknown number of oilspills would occur from development of State of Alaska territorial waters in Hope Basin, Norton, North Aleutian, and private leasing near Barrow Arch and the Alaska Peninsula planning areas. Fishing activity in the area also contributes to cumulative impacts in the area. These total projects or activities could affect cultural resources with population settlement impacts, looting, and oiling of artifacts. The cumulative impacts of these oilspill events, projects, and activities are expected to produce a very high impact to cultural resources in the Kodiak planning area.

In relation to the unlikely case of all resources in the planning area leased and developed, the alternative contributes 15 percent of spills greater than 1,000 barrels and 12 percent of spills greater than 10,000 barrels. These proportions are reduced considerably when the tankering from other Federal OCS planning areas and State lease sale areas (to an unknown extent) are considered. Here the alternative contributes low impact to the total cumulative case. Consequently, the most important causal agent for potential cumulative impacts on cultural resources is population impact and oilspills. The contribution of the proposal to the cumulative impacts in the Shumagin planning area is considered insignificant when only the resources described for this alternative are developed. So too is the contribution of the proposal to the cumulative impacts when all resources in the planning area are assumed develped in the cumulative case.

2) Impacts of Special Concern

a) Fish and Commercial Fisheries

(1) Important Fisheries Resources: The important commercial fishery resources of the Shumagin planning area include all five species of Pacific salmon (primarily pink salmon), king crab, tanner and dungeness crab, shrimp, halibut and several species or groups of bottomfish (ocean perch, blackcod, walleye pollock, Pacific cod, sole, and flounder). Subsistence fisheries tend to rely more heavily on salmon, and to a lesser degree on crab and other shellfish. Impacts to these resources would result from accidental oilspills and discharge of drilling effluents and wastes.

Over the life of the proposal, 0.6 oilspills greater than 1,000 barrels and 0.2 oilspills greater than 10,000 barrels are expected to result from Alternative I-1 South Alaska sales. For the sake of this analysis all the South Alaska sales' resource estimates and resultant development are assumed to occur in the

Shumagin planning area. Oilspills can impact fish populations by causing short-term acute impacts or long-term sublethal impacts. Since most oil remains at or near the surface, species that are most vulnerable are those that inhabit the surface layer or shallow nearshore at least some time during their life cycle. These species include salmon (adult and juvenile of all five species, and egg and larvae of pink and chum salmon), crab (larvae of all species), shrimp (adult), and several species of demersal (bottom) fish (eggs and larvae).

Salmon: Adult salmon (all five species) would be vulnerable to oil contamination if a spill contacted areas in or near the mouths of rivers during or preceding periods when these fish are congregating near these river mouths prior to migrating up river to spawn. Smolt would be susceptable to adverse impacts in the same areas during out-migration or in nearshore areas during their first few months in the marine environment. Pink and chum salmon would be vulnerable during all life stages as these species spawn intertidally to some degree. Vulnerability to any of the five species would vary depending on the timing of the spawning or out-migration of a particular population or run. All five species in this planning area exhibit a period of vulnerability (spawning period) of approxmiately three to four weeks. This period of vulnerability occurs between the months of May and September. Very little is known about the movements of juvenile salmon.

If an oilspill contacts a nearshore area, especially off the mouth of a salmon stream, several impacts would occur. These impacts would be any of a variety of lethal or sublethal toxic responses, or the loss of fish prey organisms. Adult salmon are highly mobile, and some evidence suggests that this life stage could detect and avoid toxic levels of aromatic hydrocarbons in solution (Weber et. al., 1981). Therefore, the major concern seems to be that these adults would avoid areas of contamination, which if found off the mouths of major spawning rivers would result in delays in spawning runs or actual blockage of the river or stream. Given the fact that oilspills in the marine environment generally result in concentrations less than those which have proven toxic to adult salmon (Malins, 1977), it is quite unlikely that this type of impact would occur. Even if toxic concentrations did occur, these concentrations would not remain long in marine waters, especially off the mouth of major rivers where dilution would occur rapidly.

Salmon smolt on the other hand would be more vulnerable, in that they would remain in nearshore waters for longer periods while they feed and grow in preparation of movements farther offshore. However, like adult salmon juveniles appear to possess the ability to detect toxic concentrations of petroleum hydrocarbons (Maynard et al., 1981). If this is the case, then oilspills in the nearshore could possibly be avoided to some degree by this life stage. Additionally, as stated above, toxic concentrations in the range of concern (5-15 parts per million [Maynard et al., 1981] of aromatic hydrocarbons) would not be expected in marine waters. However, considering that a spill could remain several days or several weeks in coastal waters, portions of a population may be subject to prolonged stress from sublethal effects.

The eggs and larvae of pink and chum salmon that occur in marine intertidal areas would be the most vulnerable of these earlier life stages. It would be difficult to quantify the impacts to a local salmon fishery from oilspill

contamination in a spawning or larval rearing area. However, it is possible that a large portion of eggs and larvae could be lost. The gravity of this loss, however, becomes somewhat obscure when one considers that natural mortality of eggs and larvae may be as high as 75 percent for each of these life stages. The difficulty would be in ascertaining what percentage of those lost from oil pollution would have succumbed naturally. It is possible that most of a year class from a local population could be lost. When considering the large annual fluctuations in these species, however, this may not always be significant. Generally, the loss of a year class is not a desirable effect. It can significantly reduce later year population levels.

Given the extremely low number of expected spills, and the narrow periods of vulnerability at least for adult and juvenile salmon, it is unlikely that an oilspill would contact important nearshore areas during the period when salmon are present. The level of impact to a local pink or chum population could be high as a result of oil contacting an important spawning and larval rearing, intertidal area. Areas of importance in this discussion include the numerous bays on the south side of the Alaska Peninsula (Chignik, Mitrofania, Ivanof, Stepovak, Pavlof, Cold, Morzhovoi, Ikatan Bays, and areas around Popoff Head, Deer Island, and Unimak Bight).

Shellfish: All three species of crab (Tanner, dungeness, and king) have similar life histories in that adults spend the winter months in deep water (150-400 m) and migrate to shallow (6-20 m) waters in the spring and summer to spawn. During this period, the eggs which have been carried by the female since the previous spawning period hatch and become free swimming planktonic larvae.

Distribution of these most sensitive larval forms is generally wide-spread, and therefore, would be the most susceptible to contact by an oilspill. The likelihood of such an interaction then is high at least once during the life of the field. Even in the case of a very large spill (10,000 barrels or greater) in the Shumagin region, only a small insignificant percentage of crab larvae would be contacted by concentrations of oil (1-10 ppm) that would cause mortality. The level of impact on crab larvae is then expected to be low for regional populations.

Another effect on crab populations may result from oil sinking to the bottom and contacting aggregations of adult or juvenile crab or by contaminating large areas and affecting their food supply. There is greater opportunity for this phenomena in shallower, nearshore waters in the bays of the Alaska Peninsula (see above) where adult and juvenile dungeness crab spend lengthy periods. The liklihood of such an event is somewhat less than contact to the larval stages; however, given the broad distribution of crab populations, this contact with adult and juvenile crab is more likely than with larval stages. The level of impact to these life stages on a regional basis is low. Local dungeness crab populations in nearshore waters could, however, suffer at least one short-term decline if their habitat is affected.

Shrimp: Four species of Pandalid shrimp (pink, humpy, coonstripe, and spot) exist in the waters of the Shumagin planning area. Pink shrimp, however, predominate in the catch. All species are known to inhabit the continental shelf of this region out to depths of around 200 meters. Mating occurs in September in coastal shallows with the eggs carried offshore by the females

until they hatch the following March and April. Young shrimp are found in the shallow bays and move into deeper water as they grow. This shallow water period is the period of greatest vulnerability for large numbers of both young and adult shrimp to be contacted by an oilspill. Areas of concern include several bays along the south side of the Alaska Peninsula (Stepovak, Ivanof, Cold, Morzhovoi, and Parlof Bays). Given that these areas are somewhat sheltered, it is unlikely that the one expected spill would contact any particular bay. At most, one spill would affect a local population once during the life of the proposal. The level of impact to shrimp in this region is therefore expected to be low.

Demersal Fish: Demersal species including halibut would be less affected by an oilspill than any other species group. The most vulnerable species are those which have egg or larval forms that inhabit surface or nearshore surface waters. Important species in the Shumagin region which display this characteristic are halibut, ocean perch sole, flounder, and pollock. Because fish eggs and larvae are relatively sensitive to hydrocarbon contact, and because of the broad distribution of these life stages throughout the region it is likely that the one oilspill would result in a low ecological loss to these species. The level of impact on a regional basis, would be low.

Several types of discharges and effluents could be released during OCS oil and gas activities. OCS Operating Orders, prohibit disposal of any waste materials into the ocean that will create conditions which will adversely affect aquatic life. Disposal of waste materials is regulated by the Environmental Protection Agency. Of concern are drilling muds because very little is known about their long-term, chronic impacts. There are indications that these muds could produce elevated trace metal concentrations in marine organisms and interfere with reproductive processes. However, given that only 7 exploratory and 26 productive wells are projected for this alternative, a relatively small amount of effluent material would be discharged, (Section V.D.12.a.1)b)) and a small bottom area would be affected. Therefore, impacts to fish and shellfish are expected to be very low.

Conclusion. Fish and shellfish that occupy surface and nearshore waters at least some portion of their life history are expected to suffer low ecological losses. Local impacts to pink and chum salmon, dungeness crab, and shrimp could be high but would recover rapidly. Overall, regional impacts to fish and shellfish would be low.

Cummulative Impacts. In the unlikely event that all tracts in the Shumagin planning area are leased and developed during the life of the proposal, the expected number of oilspills is about 3.9 for spills greater than 1,000 barrels and 1.7 for spills greater than 10,000 barrels. Additionally, tankering of oil through the Shumagin planning area would occur as a result of the proposed federal sales (Barrow Arch, Hope, Norton, Navarin, St. George, and North Aleutian Shelf) and state sales (Hope Basin, Norton (Sale 38) and Bristol Bay Uplands (Sale 41)). Development of the resources of the North Aleutian Shelf and Navarin Basin (Federal) and the Bristol Bay Uplands (state) could involve a pipeline from these leases to a tanker terminal in one of the bays (Pavlof, Morzhovoi, Ikatan, and Cold Bay) on the south side of the Alaska Peninsula (Shumagin planning area).

Considering the resource estimates (total resources developed) of these proposed sales, it is possible that over 3.5 billion barrels could transit the Shumagin area via tankers. This would significantly increase the oilspill risk to the area.

Given this significant increase of expected spills, it is possible that one large spill may follow another, or that spills may occur in subsequent years in the same area. This is especially true of the bays on the south side where a tanker/pipeline terminal may be located. Therefore, the cumulative impact of these oilspills on fish populations probably would cause moderate ecological losses to fish or shellfish populations that inhabit surface or nearshore waters. Of primary concern would be the salmon and crab populations which inhabit these bays during critical life periods.

Fish populations are also stressed by commercial fishing pressure which combined with the cumulative oilspill impact could result in a high ecological loss to certain species (primarily pink salmon and crab) unless management action (i.e., area closures) is taken to relieve the harvest pressure. Overall, the expected regional impacts on fish populations due to the cumulative impacts is moderate.

The proposal contributes less than 3 percent of the oilspills greater than 1,000 barrels and less than 0.08 percent of the spills greater than 10,000 barrels, and does not contribute significantly to the other impact agents. When compared to the non-OCS-related impacts (tankering and fish harvest pressure), the contribution of this alternative to the cumulative case would be moderate. The contribution of this alternative when only the resources of OCS resources described in the alternative are leased (as opposed to total development of OCS resources) is still moderate.

(2) Impacts on Commercial Fisheries: The Shumagin planning area comprises one of the most valuable commercial fishing areas in Alaska. In 1979, over 96 million pounds of fish and shellfish worth $58 million to commercial fisherman were landed in this region (Alaska Department of Fish and Game, 1980). This represents about 9 percent of the total Alaska landings. For the purpose of this analysis, a high economic impact on any commercial fishing industry results when there is a ten percent or greater economic loss to that industry. A moderate economic impact results when there is an economic loss of less than ten percent. A low economic loss results when there is a small economic loss to the industry. It should be recommended however, that the loss to individual fishermen probably will be more serious than the loss to industry.

Impacts on commercial fisheries under the proposal would result largely from competition for labor, ocean space use conflicts, competition for infrastructure services, and reduced catch due to ecological loss (as discussed above). This analysis (except for reduced catch) draws largely from Tobolski et. al, (1981), which provides an analysis of fishing industry impacts in the Bering Sea.

Over the life of the proposal, about 0.6 oilspills greater than 1,000 barrels and 0.2 oilspills greater than 10,000 barrels are expected to result from Alternative I-1. Since fish resources are expected to sustain low ecological losses (see discussions in Section V.D. 12.a) 2) a)(1), the commercial fishing

industry could sustain low economic losses because there would be a loss in potential catch. These potential impacts are expected to be short term in duration, and only occur once during the life of the field given the low number of expected spills.

A large oilspill, could impact commercial fishing by causing a disruption in space and time. It is unlikely that commercial fisherman will harvest in the area of an oilspill because 1) their boats and gear may be contaminated, 2) they may be restricted from the contaminated area while clean-up efforts are underway, and 3) direct coating and incorporation of petroleum hydrocarbons can cause tainting of marine organisms, rendering them undesirable or unmarketable. This disruption in fishing would affect the nearshore salmon and shellfish fisheries to a greater degree than the offshore demersal fish fisheries. In the unlikely event that a large oilspill contacted this area during the height of the fishing season (varies by species) a moderate to high impact would result on the local fishery (especially on the salmon fishery). Regional economic impacts, however, would be low.

A big portion of fishery related labor in the region of interest is made up of fishermen whose earnings are lower than may be paid to unskilled workers in the oil and gas industry. This is likely to lead to a high willingness of this labor pool to transfer to OCS employment. However, because the number of jobs to which they would be attracted is limited and because there is a considerable excess in the number of crewman available for fishing jobs, the impact due to labor competition would be very low.

Ocean space use conflicts consist of loss of and damage to fishing gear, loss of access to fishing grounds, and collisions among vessels. Fishing gear conflicts may result from: 1) oil fouling of gear (as stated above), 2) catching or "hanging" gear (trawl nets or scallop dredges) on obstructions such as pipelines and bulk material inadvertently discarded by industrial operations, 3) and vessel traffic and seismic operations (trailing long seismic cables) in areas where pot-fishing (crab) and longlining (halibut) occur. Secondary economic impacts from gear conflicts occur from fishing time lost while waiting for repair or replacement of gear. This may be especially acute in these remote areas in Alaska where replacement gear must be shipped from distant suppliers and transportation services are limited.

The analysis for the St. George Basin (Tobolski, 1981) which projected the number of gear damage/loss claims that would be submitted as a result of oil and gas development concluded that there would be 5 claims ($90,000 in 1980 dollars) per year intially increasing to 12 claims ($216,000 in 1980 dollars) per year during full development. These results were based on the estimated future fishing effort and the projected number of oil and gas installations (platforms) with claim frequencies established for these parameters from North Sea historical data. Given that the intensity of fishing and OCS development is anticipated to be greater in the St. George Basin than in the Shumagin planning area, the number of claims should be less. Even if the St. George figures are assumed, this would represent a total economic loss of less than 0.4 percent to the regional fishermen. However, this would represent a very high loss to individual fishermen.

The emplacement of one platform in the planning area would result in a loss of access of fishing grounds in the amount of 78.5 hectares (considering a 500

meter buffer radius for the platform). This represents an insignificant loss to the fishing industry.

Attempts by domestic fishermen to exploit the hitherto foreign dominated demersal fish resources will introduce new vessel traffic in the planning area. Similarly, the OCS supply and support vessels will bring additional traffic leading to increased chances of vessel collisions. This may be especially true in restricted areas such as the entrances to Cold Bay, Ikatan Bay, or Pavlof Bay. However, the analysis for the St. George Basin (Tobolski, 1981) concluded that only one collision would be expected in 20 years due to increased OCS vessel traffic. Given that OCS development in the Shumagin planning area will not be as heavy as St. George, it is safe to assume that one vessel collision would be the upper limit for the life of the proposal. Such a collision may render only slight to moderate damage or even a complete loss (sinking) of one or both of the vessels involved. If the latter is the case, especially for a larger vessel (catcher-processor), the impact to the fishing industry could be moderate considering the 20 year life of the field.

The most likely damage, however, would be much less, because most collisions do not involve sinking or major damage. Statistics of casualties in U.S. waters show that the average value lost per vessel involved in a collision is approximately $22,137 (1980 dollars). If a fishing vessel is involved in a collision during the life of the proposal, then the annual loss equivalent would be $1,107. The expected level of impact to the fishing industry, therefore, is very low.

Impacts resulting from competition for infrastructure services would vary depending on the location of OCS development. In this region these impacts would most likely occur in the vicinity of Cold Bay. In this case competition of these services would not be expected. Rather the development of port and harbor facilities to accomodate the limited needs of the oil and gas industry may serve to benefit the segment of the fishing industry centered in this region. This may result from an increase in moorage space thus allowing more fishing vessels to access the Cold Bay harbor. This will increase the ability of Cold Bay to participate in developing domestic bottom fishing fishery in this region. The expected level of impact from competition for infrastructure services is expected to be low.

Conclusion. As a result of the proposal the expected level of impact on the commercial fishing industry in the Shumagin planning area is expected to be low. The loss to individual fishermen, however, would be high.

Cumulative Impacts. As previously noted, the cumulative impacts on fisheries resources (salmon, crab) in the Shumagin region would be moderate. This would result from the increased number of expected spills (3.9 spills greater than 1000 barrels and 1.7 spills greater than 10,000 barrels) that result from the tankering of oil from the proposed Federal and State leases north of the Alaska Peninsula. As a result of this moderate loss the fishing industry would be expected to sustain a moderate economic loss.

Because full development of the Shumagin OCS would not substantially increase OCS activities, other fishing industry impacts (i.e. competition for infrastructure services, ocean space use conflicts, and competition for labor) would not increase significantly over the impacts of the proposal (as stated

above). In terms of oilspills, the contribution of this alternative to the cumulative case would be moderate. The contribution of this alternative when only the resources described in the alternative are leased (as opposed to the total development of OCS resources) would be slightly less (see cumulative impacts in Section V.D.12.a.2)a)(1)).

b) Endangered Species: See discussion under Impacts on Endangered Species in the Gulf of Alaska section.

Conclusions. The impacts on endangered species in this area will be moderate, as the area is important as a breeding, feeding and a migration area.

Cumulative Impacts. In the unlikely event that all potential oil and gas resources of the Shumagin planning area are leased and resources subsequently are developed over the life of the field, the expected number of oilspills is 3.9 spills greater than 1,000 barrels and 1.7 spills greater than 10,000 barrels. An additional unknown quantity of oilspills is expected to result from tankering from Federal OCS lease sale in the Bering and Arctic planning areas. Additional activity which could contribute to cumulative impacts in the planning area is commercial marine traffic. These total projects or activities could effect endangered birds and whales through oilspills, disturbance, and reduction in food sources. The cumulative impacts of these oilspill events, projects and activities are likely to produce a low impact to endangered birds in the Shumagin planning area and moderate to high impacts to whales.

In relation to the unlikely case of all resources in the planning area leased and developed, the alternative contributes 15 percent of spills greater than 1,000 barrels and 12 percent of spills greater than 10,000 barrels. These proportions are reduced when the tankering from other Federal OCS planning areas (and State lease sale areas to an unknown extent) are considered. Here oilspills from Shumagin leasing contributes little to the total cumulative case. Consequently, the most important causal agent for potential cumulative impacts on endangered birds and whales is tankering from other Federal State lease sales. The contribution of the proposal to the cumulative impacts in the Shumagin planning area is considered signficant when only the resources described for this alterantive are developed. The contribution of the proposal to the cumualtive impacts is considered insignificant however, when all resources in the planning area are developed and considered as a portion of cumulative impacts.

c) Habitats and Resources of Special Concern: More than 2 million highly (oilspill) vulnerable seabirds nest and feed in the Shumagin planning area, and large numbers of sea ducks overwinter in this area. Large numbers of sea otters, seals, and sea lions also occur in this area. Habitats of particularly special concern for these species include the marine waters near the Semidi Islands, Shumagin Islands, Sandman Reefs, and Unimak Pass. A major portion of the northern fur seal population migrates through this area. Adverse impacts of OCS activities from the proposal could come from oil pillution of the marine environment and man-made disturbance.

The species most likely to be significantly affected by potential oilspills as a result of OCS activities in the Shumagin Basin are diving seabirds especially alcids such as murres, auklets, and puffins, foraging in the marine waters, and sea ducks overwintering in the bays. Greater than 60% of the total nesting

seabird population in this planning area are considered highly vulnerable to oil pollution and would probably suffer substantial mortality if a large oilspill occurred in this area. Local sea otter populations may also be significantly reduced in the event of a large oilspill. Highly vulnerable fur seals may be affected if a major spill occurs during their migration through the area.

Conclusions. The overall effects of OCS activity in this area will be moderate.

Cumulative Impacts. In the unlikely event that all potential oil and gas resources of the Shumagin planning area are leased and all resoureces subsequently are developed over the life of the field, the expected number of oilspills is 3.9 spills greater than 1,000 barrels and 1.7 spills greater than 10,000 barrels. An additional unknown quantity of oilspills is expected to result from tankering from Federal OCS lease sales in the North Aleutian, St. George, Navarin, Norton and Hope planning areas. Additional activities which could contribute to cumulative impacts in the planning area are commercial fishing, hydroelectric projects and boat harbors in Kodiak and Port Lions. These total projects or activities could effect birds through oilspills, disturbance, and commercial harvest of food sources. The cumulative impacts of these oilspill events, projects and activities are likely to produce a moderate-high impact to birds in the Shumagin planning area and a moderate impact to marine mammals.

In relation to the unlikely case of all resources in the planning area leased and developed, the alternative contributes 15 percent of spills greater than 1,000 barrels and 12 percent of spills greater than 10,000 barrels. These proportions are reduced when the tankering from other Federal OCS planning areas (and State lease sale areas to an unknown extent) are considered. Here the alternative contributes little to the total cumulative case. Consequently, the most important causal agent for potential cumulative impacts on birds and marine mammals is tankering from other Federal lease sales. The contribution of the proposal to the cumulative impacts in the Shumagin planning area is considered significant when only the resources described for this alternative are developed. The contribution of the proposal to the cumulative impacts is considered insignificant, however, when all resources in the planning area are developed.

d) Air Quality: A discussion of the primary factors used in assessing onshore air quality impacts which may result from OCS-related acitivites and the method employed in quantifying the impact on this planning area are described in Section V.A.3. of this document.

As is noted at the beginning of the discussion of impacts from development of hydrocarbon resources in the Shumagin planning area, all the resources and infrastructure for the South Alaska area were attributed to the Shumagin for the purpose of this analysis. The resources and infrastructure are wholly assigned to each of the four South Alaska areas. Thus, it is estimated that 7 exploratory wells will be drilled to identify the resources and 26 development/production wells and one platform to develop the resources under this alternative. It was assumed for the purpose of analysis, the production from this platform would be 3.3 million barrels of oil and 26.7 billion cubic feet of gas per year. All of the oil and gas will be transported to shore via

subsea pipeline. Estimated representative emissions for exploration/development are provided in Table V.D.12.a.2)d)-1. This information is derived from Table V.A.3-1.

Table V.D.12.a.2)d)-1. Estimated Representative Emissions

Activity	Production at Platform (tons per year)				
	VOC	NO_x	TSP	SO_2	CO
oil/gas	27	396	-	0.1	150
barging	None	-	-	-	-

Offshore OCS facilities located within 20 miles from the Shumagin shoreline are expected to need emission controls. The one platform associated with the development of resources under the proposal may be located within 20 miles of the coast and therefore requires emission controls. One new gas processing plant may be required as a result of the proposal; however, as there are no nonattainment areas likely to be influenced by this activity in the planning area, the installation and operation of a gas processing plant is not expected to significantly influence the air quality rating of the area.

A low qualitative impact is expected from routine emissions. The area is in attainment for the primary pollutants; however, some effects will occur from both the onshore gas processing facility and the platform, should it be sited within 20 miles from shore. If it is located beyond 20 miles from shore, the impacts will be very low if a blowout, oilspill, or fire was to occur near shore; short-term violations of several NAAQS could occur depending on the type and duration of the accident.

Any emission sources which would adversely affect the onshore air quality would be subject to mitigation required by EPA and the State, if located onshore, and DOI, if located on the OCS. ERG (1981) discusses mitigation measures for OCS facilities.

Conclusions. Overall, the level of expected impacts to air quality due to the proposal are very low to low. The siting of the platform within 20 miles of the coast and the necessity for emission controls on the platform is the determining factor for low these expected low impacts.

Cumulative Impacts. It is estimated that a total of 0.9 billion barrels of oil and 5.3 trillion cubic feet of gas exist in the entire South Alaska Federal OCS. In the event that total development of all Federal OCS resources occurs over the life of the proposal, 5 new platforms with 170 wells would be required. It is unlikely that this development would actually occur over the next 30-35 years. It is also highly unlikely that all of the development would occur in just one of the four South Alaska planning areas. However, for the purpose of impact analysis, it is assumed that total development of resources occurs in the Shumagin planning area over the life of the proposal.

The major factors affecting the onshore air quality in the planning area as a result of OCS development are 1) the number of new wells drilled, 2) the location of new platforms, 3) the timing of activities, and 4) the instantaneous local meteorological conditions. Non-OCS related population growth and industrial development will be occurring in the area but not in

significant quantities or at a rate which will change the character of the area (or its air quality) noticeably.

Impacts to air quality from the development of regional OCS resources, OCS resources north of Shumagin which are transported via tanker through Unimak Pass, and other non-OCS projects, proposals and activities are low. The contribution of the proposal to the air quality in the planning area, for both the most likely development of resources and for the total development of resources in the region and northeast planning areas, is minor as any uncontrolled pollutants are expected to dissipate before reaching shore.

e) Recreation and Tourism: The Shumagin Islands just southwest of the Shumagin Basin is accessable via Sandpoint to the major Alaska airlines. Since the airlines stop here this area is on the route of tourists going to Dutch Harbor and the Pribilof Islands. The added air traffic induced by oil exploration and development will be small relative to areas such as Anchorage, but relative to existing tourist trade and recreation activity, it will be high. Impact as related to the occurrance of oilspills from exploration and development depend on the amount of major shoreline designated or used for recreation, amount of shoreline designated as environmental preservation area, and oilspill factors such as miles of exposed shoreline front as a percentage of the total shorefront, amount of seasonal use, and the cleanup capability available. The percent of the total recreational area exposed to oilspill risk is low. Exploration and development will not affect the resources of the area as heavily as will the installation of pipelines and onshore infrastructure. As most of the planning area on the north side is shoreline the Alaska Peninsula National Wildlife Range wilderness values of those beachland areas are the resources that will be changed in the event of an oilspill. Recreational hunting and fishing pressure in the area will be increased slightly by additional population due to oil exploration and development.

Conclusions. With little recreation and tourism in the area, impacts will be low.

Cumulative Impacts. In the unlikely event that all areas of the Shumagin planning area are leased and all resources subsequently are developed over the life of the proposal, the expected number of oilspills is 3.9 spills greater than 1,000 barrels and 1.7 spills greater than 10,000 barrels. An additional unknown quantity of oilspills is expected to result from tankering from Federal OCS lease sales in the Kodiak, North Aleutian, and St. George. An additional unknown number of oilspills could occur from development of State of Alaska territorial waters in Hope Basin, Norton, North Aleutian, and private leasing near Barrow Arch and the Alaska Peninsula planning areas. Additional projects or activities that could contribute to cumulative impacts in the planning area are tanker, oilspills, and fishing. These total projects or activities could affect recreation and tourism in the following ways: population impacts, looting, oiling of artifacts, and positive impacts such as increased information form surveys. The cumulative impacts of these oilspill events, projects, and activities are expected to produce a moderate impact to recreation tourism in the Kodiak planning area.

In relation to the unlikely case of all resources in the planning area leased and developed, the alternative contributes 15 percent of spills greater than

1,000 barrels and 12 percent of spills greater than 10,000 barrels. These proportions are reduced considerably when the tankering from other Federal OCS planning areas (and State lease sale areas to an unknown extent) are considered. Here the alternative contributes low impact to the total cumulative case. Consequently, the most important causal agent for potential cumulative impacts on recreation and tourism is population impact and oilspills. The contribution of the alternative to cumulative impacts is insignificant in the case of only the resources described as developed as well as in the case of all resources leased and developed in the planning areas.

f) Socioeconomic Factors: The Shumagin area is one of four OCS planning areas within the large south Alaska region. (The other three are the Gulf of Alaska area, the Cook Inlet area, and the Kodiak area.) Although the probability of the discovery of commercial quantities of petroleum somewhere within the South Alaska region is considered virtually a certainty, no information is presently available concerning the probabilities of commercial discoveries in the individual OCS planning areas within the South Alaska region. There also are no estimates available for the quantities of oil and gas expected from discoveries in the individual OCS areas, although estimates have been prepared for the South Alaska region as a whole. Consequently, employment and population impacts can be estimated for the South Alaska region, but not for the component areas.

Within the south Alaska region, the discoveries expected to result from the proposed 5-year leasing program are 130 million barrels of oil and 0.75 trillion cubic feet of natural gas.

Most petroleum workers who develop oil and gas resources within the south Alaska region would live in dormitories during work periods, and during rest periods would commute to residences in Anchorage. This would be true for petroleum developments in any of the four OCS planning areas within the south Alaska region. The long-term statewide employment impact of petroleum discoveries in the south Alaska region resulting from the proposed 5-year leasing program would probably be about 300 additional jobs, including all direct and indirect employment effects. The corresponding population impact would be about 600 additional permanent residents of Alaska. Almost all of the resident population impact would probably occur in Anchorage.

Conclusions. Given a commercial discovery, 600 new people would re-locate within the State. Most of these new residents would live in the city of Anchorage. The impact of the increased population upon the planning area itself would be low to moderate.

Cumulative Impacts. In the unlikely event that all areas of the Shumagin planning area are leased and all resources subsequently are developed over the life of the proposal, the total cumulative impacts on resident employment and population in the adjacent land areas (Aleutian Island census division) during the years 1980 - 2000 would be very high in the sense that potentially significant long-term stress on public and private services and facilities can be expected, resulting from extremely large expected increases in resident employment and population. The largest expected increases will result from non-OCS activities, although OCS activities will also generate very large employment and population impacts and result in very high impacts.

The principal non-OCS activity expected to result in employment and population growth will be the rapid expansion of the U.S. bottomfish industry, which is expected to largely displace the huge foreign bottomfish operation in the area by the year 2000. Impacts from the U.S. bottomfish industry expansion are expected to increase total employment and population in the entire Aleutians Islands census division by 100 percent to 400 percent. Impacts on the key community of Unalaska/Dutch Harbor are estimated to increase resident employment and population by 300 percent to 1000 percent by the year 2000. Bottomfish development is expected to account for well over half of the cumulative impacts in the Aleutian Islands census division.

OCS activities in the North Aleutian Shelf, St, George Basin, Navarin, Norton Basin, and as many as seven other OCS planning areas will also contribute to employment and population growth in the Aleutian Islands census division. Although the combined impacts from these other OCS activities could be quite large relative to the existing (1980) levels of employment and population, their combined impacts are expected to be less than the impacts expected from expansion of the U.S. bottomfish industry.

Impacts of OCS activities in this planning area cannot be estimated with any certainty at this time due to the lack of information regarding petroleum resources in the area. Total resources for the entire South Alaska region are extimated at 850 million barrels of oil and 5.25 TCF of gas. Development of these resources (which include the proposal and sales subsequent to this 5-year schedule) could total 500 jobs state-wide and 1,000 additional permanent residents of the State. Almost all the resident population will be in Anchorage.

g) Native Subsistence Cultures: The Shumagin planning area, in terms of potential village impacts, extends from the Chignik villages on the south side of the Alaska Peninsula on the east to the village of False Pass on Unimak Island to the west. Villages in this area include False Pass, King Cove, Belkofski, Sand Point, Chignik, Chignik Lake, Chignik Lagoon, Ivanof Bay and Perryville. These relatively isolated Aleut villages have long maintained either Aleut-Russian or Aleut-Scandinavian cultures and a highly valued maritime tradition and way of life. Recent population data are available only for the larger incorporated places of King Cove and Sand Point, which had populations in 1980 of 460 and 625 respectively. The population of these two communities was composed of 80 percent Aleut (367) in King Cove and 57 percent Aleut (357) in Sand Point. The other unincorporated Aleut villages are estimated to have populations ranging from 50-100 persons, of which 80-90 percent would be Aleut people. Consequently, the planning area is estimated to have an Aleut population of approximately 1,000 people.

Commercial fishing is the primary means of livelihood for the villages in the planning area. Most all the salmon fishing takes place south of the Alaska Peninsula between Unimak Bight (False Pass fishery) and Popoff Head near Sand Point. Vessels from King Cove and Sand Point that rig for crab in the winter, range somewhat wider. The other villages are primarily involved in salmon fishing. Aspects of village livelihood derived from fishing is more fully discussed in the recent OCS Lease Sale 70 DEIS.

Salmon, caribou, migratory waterfowl, and intertidal organisms are the primary subsistence resources of the planning area. Caribou are hunted in season on

the mainland, generally reached by use of the family fishing vessel. Salmon are caught for subsistence use by various methods and means, such as purse seines in the Chigniks and set gillnets in False Pass. Other secondary or supplemental subsistence resources are used to various degrees in the villages, with the smaller villages involved the most in subsistence harvest of a wide variety of resources.

Disruption in the access to or availability of locally used marine subsistence resources from the effects of localized oilspill events could have major impacts on village sociocultural systems. The statistically derived mean number of spills equal to or greater than 1,000 barrels is 0.6 for the planning area. The comparable statistic for spills equal to or greater than 10,000 barrels is 0.2. Spills reaching locations critical to specific marine resources used locally or within the immediate vicinity of the villages, where beaches, lagoons or wetlands are intensively used for subsistence resorce harvest, could increase the possibility for direct and indirect impacts on local sociocultural systems to be realized. Spills effecting the commercial salmon or crab harvest in the south Peninsula area similarly could effect the total livelihood pattern of the Aleut villages in the planning area. The villages most susceptible to the effects of oilspill events would be those relying on a limited set of subsistence and commercial fishing resources and having limited technology (essentially in vessel and fishing gear) to seek alternative resources. Family stress and discontinuity could result in the potential for seeking alternative subsistence and commercial resources were frustrated by existing family investments in ill-adapted fishing technology. The small number of spills expected over the life of the field reduces the likelihood of such impacts occurring.

Direct and indirect impacts on the villages from population growth associated with the proposal are unlikely. Scenarious used in the OCS Lease Sale 70 DEIS for developing offshore resurces north of the Alaska Peninsula (and applicable to the Shumagin planning areas as well) focused on the community of Cold Bay as initially impacted through use of its commercial jet airfield as a base for offshore oil exploration and later as the most likely site for housing personnel associated with an ice-free terminal facility located on the south side of the Alaska Peninsula. Cold Bay is a non-Native community oriented to the operation of the commercial airfield and military and other governmental functions.

Conclusions. Impacts on village subsistence cultures over the life of the field are expected to be low as a result of the low number of expected spills and the unlikely prospect of oil and gas facilities being located near or within Aleut villages.

Cumulative Impacts. Should total development occur, 3.9 oilspills greater than 1,000 barrels and 1.7 spills greater than 10,000 barrels. An additional unknown quantity of oilspills is expected to result from tankering from federal OCS lease sales in the Barrow Arch, Hope Basin, Norton, Navarine, St. George and North Aleutian Basin planning areas. An additional unknown number of oilspills also could occur from development of State of Alaska territorial waters in Hope Basin, Norton Sound and the Bristal Bay uplands. Additional projects or activities that could contribute to cumulative impacts in the planning area are private onshore leasing, hydro projects, more diversified fisheries development, and the Bristol Bay Cooperative Management Plan. These

projects or activities could effect Native subsistence cultures in the following ways. Oilspill damage or other disturbances to local subsistence resources could divert, displace or reduce the availability of subsistence resources. Major disruption in the access to or availability of local subsistence resources where they were traditionally found could disrupt traditional subsistence patterns to an extent as to reduce subsistence catch of the resources customarily used, prevent the pursuit of subsistence practices by segments of the population due to the costs of using an increased subsistence range, disrupt traditional (cultural and spiritual) patterns of obligation fulfillment for kinship-based assistance networks and care of the elderly (as examples), and induce chronic stress and anxiety over imbalances in nature. The fear of further changes in such relationships, and the inability to do anything about it could induce additional anxiety. Impacts from such effects could include increased disease, malnutrition and mental disorders, family breakup and conflict, substance abuse and generational conflict. Localized impacts could be magnified within the region through the breakdown of customary inter-village (through family networks) resource distribution patterns and obligations. The cumulative impacts of these oilspill events, projects and activities are expected to produce a moderate to high impact to Native subsistence cultures in the Shumagin planning area.

3) Impacts on Other Management Plans: A coastal resource service area has been proposed that would cover the islands and peninsula area east of Unimak Pass to 160° W. longitude within this area are the cities of King Love and Sand Point. A district program is expected by the end of 1984, in time for the South Alaska sale. Activity in this area will also be affected by the Bristol Bay Cooperative Management Plan, required by the Alaska National Interest Lands Conservation Act (ANILCA). The rest of the adjacent shoreline is not being planned for at this time.

4) Unavoidable Adverse Impacts: Oilspills, discharges of drilling effluents (muds, cuttings, and formation waters) and sewage disposal would result in unavoidable adverse impacts to water quality under the proposal. Impacts, except from oilspills, could be mitigated by EPA NPDES regulation.

Water supply would be unavoidably adversely affected by this proposal. Limited supplies would be consumed by OCS-related infrastructure and developoment, creating demands on supplies of unknown quantity.

The unavoidable adverse impact for land use would be a reduction in the amount of land available for other uses. Occupation of land by OCS-related activities and structures would be minimal.

Coastal ecosystems would be unavoidably adversly affected by oilspills and various discharges as mentioned above for water quality. The level of impact would be restricted both geographically and temporally.

The proposal would have unavoidable adverse impacts on fish by oilspills contacting nearshore habitats or eggs and larvae which occur on or near the surface. Oilspills would also affect commercial fishermen by reducing the number of harvestable fish. These impacts are expected to be minimal.

Birds, marine mammals, and endangered species would also suffer unavoidable adverse impacts from oilspills. The level of impact would depend on when and

where the oilspill occured. Regional endangered species consultation with NMFS and FWS is required and would be conducted as needed.

Recreation and tourism resources could be adversely unavoidably affected by damage to visual resources through the intrusion of onshore support infrastructure and road systems, nearshore systems of causeways, pipelines and drilling islands, offshore oil and gas platforms, and vessel and aircraft traffic supporting such operations. Such effects would be localized and may serve as an attraction to a segment of the recreation and tourism population.

Cultural resources offshore, such as housepits, burins, scrapers, arrowheads and other artifacts, could be unavoidably destroyed through OCS operations, but the great dynamics of the marine environment already may hve resulted in the destruction of many of these resources. Cultural resources located onshore could be lost or damaged by public pilfering or indiscriminate exposure of artifact sites.

Introduction of urban and industrial land uses, except for regional urban centers, would change the character of isolated, de facto wilderness areas, but impacts would be isolated and small in relation to the total area involved. Where urban centers are involved, land use demands generated by OCS activities could unavoidably produce adverse effects derived from the rate and relative scale of demand. Land speculation and price inflation could be experienced as well as interruptions in community facilities and infrastructure during the period necessary for such aspects of land development to catch up with increased land use demands.

Native subsistence cultures could be directly adversely affected in an unavoidable way through accidental oilspills and an increase in population, causal agents which could effect the access to and availability of subsistence resources. Such impacts have been discussed previously. Perhaps more insidious are the indirect adverse effects which could be caused unavoidably by nature of kinship-based social networks existing between regional centers and villages and the periodicity of urban-village migration customary in village regions. Localized effects in villages could have adverse effects throughout the village region. Disruption of customary urban-village migration patterns, through effects such as urban housing shortages, price inflation or reduced supply of public services, could cause hardship for those segments of the population unable or unwilling to adapt to such changes and may contribute to social disorder and disorientation of cultural value systems.

5) Relationship Between Local Short-Term Uses and Maintenance and Enhancement of Long-Term Productivity: In this section, the short-term effects and uses of various components of the environment are related to long-term effects and the maintenance and enhancement of long-term productivity. The effects of the alternative would vary in kind, intensity, and duration, beginning with preparatory activities (seismic data collection and exploration drilling) for oil and gas development, and ending when natural environmental balances are be restored.

Biological productivity would be lost in the short-term on all onshore lands used in the proposed project. These areas could be returned to productivity in the long-term with proper management. Restoration may not be entirely feasible; however, the overall loss would be a minor adverse effect. The

direct land requirements would show in both the short-term and the long-term because of disturbance. Major construction projects would cause definite changes in both the short-term and long-term. Some species may have difficulty repopulating and could be displayed.

Short-term oil pollution and the possibility of long-term cumulative oil pollution impacts could cause serious adverse effects on all components of the marine ecosystem, including fisheries. While restoration would allow fisheries production to regain original levels, any reduced annual harvests during the life of the project would be irretrievably lost. The extent is not known presently, but the potential must be recognized.

Freshwater pollution from onshore activities is a short-term effect. The long-term decrease in water quality may be considered to be a tradeoff for obtaining oil and gas resources.

The biota would be threatened in the short-term by potential oil pollution. Direct mortality could be significant through the combined effects of harassment by humans and the increased volume and frequency of noise from vessel traffic or overflying aircraft. In the long-term, such distrubances could alter behavior patterns and could drive fauna away from traditional feeding and breeding grounds or to other critical areas within their range, reducing species populations over a long period of time.

Habitat destruction could cause a reduction in subsistence species which could threaten the regional economy. The improved accessibility to primitive areas from increased construction is a short-term result of this alternative. The overall widerness value of the coast may decrease from increased land use. Increased human populations in the short-term could change the regional Native culture in the long-term. The subsistence way of life could be modified and population shifts could occur. The overall changes cannot be termed positive or negative, except by those affected.

Archaeologic and historic values discovered during development would enhance long-term knowledge. Overall, finds may help to locate other sites, but destruction of artifacts would represent long-term losses.

Consumption of offshore oil and gas would be a long-term use of non-renewable resources. Economic, political, and social benefits may accrue from the availability of oil and gas. Most benefits would be short-term and would decrease the nation's dependency on oil imports.

The production of oil and gas from the planning area would provide short-term, critically needed energy, and perhaps, provide time either for the development of long-term alternative energy sources or substitutes for petroleum feedstocks. Petroleum development in these areas may mean the irreplaceable loss of some fisheries production. The maintenance and enhancement of long-term productivity would depend on efforts to control water quality levels. Regional planning would aid in controlling changing economics and populations, and thus, in moderating any adverse impacts.

6) Irreversible and Irretrievable Commitment of Resources:

THE MORE SIGNIFICANT ENVIRONMENTAL CONSEQUENCES

Shumagin

Resource Category	Level of Expected Impacts* Scheduled Sales Only Under Alternative I-1	Cumulative Impacts of All Activities
1. General Impacts		
a. Coastal Ecosystems	low	moderate
b. Water Quality and Supply		
Water Quality	low	very high
Water Supply	very high	very high
c. Navigation and Shipping	very low	low
d. Other Uses of the OCS	n/a	n/a
e. Land Use	low	low
f. Cultural Resources	very high	very high
2. Impacts of Special Concern		
a. Fish and Commercial Fisheries		
Fish Resources	low	moderate
Commercial Fisheries	low	moderate
b. Endangered Species	moderate	moderate to high
c. Habitats and Resources of Special Concern	moderate	moderate to high
d. Air Quality	very low to low	low
e. Recreation and Tourism	low	low to moderate
f. Socioeconomic Factors	low to moderate	very high
g. Native Subsistence Cultures	low	moderate to high

* Definitions of level of impact are provided at the beginning of Section V.D.

(This table also applies to Alternatives I-2, II, IV-1, and IV-2. See text.)

a) Mineral Resources: Resources discovered would be irretrievably consumed.

b) Biological Resources: Commercial fishery losses may occur principally by oilspills interfering with salmonid migrations or by their direct contact with larval fishes and/or their planktonic food supplies. Any losses of commercial fishing incomes attributable to this alternative would be irreversible and irretrievable to the extent they were uncompensated. Unharvested commercial finfish and shellfish, as renewable resources, would be irretrievably lost to the economy.

Increased air and ship traffic and onshore activites, as well as potential habitat degradation or reduction in available food resulting from oil and gas industry operations could displace birds and mammals into less favorable environments, ultimately resulting in reduced population levels. Displacement could become irretrievable if permanent alterations of the environment were maintained by such activities.

c) Endangered Species: Under the Alternative, it is possible that endangered whales could be subjected to irreversible direct and indirect effects of oilspills, disturbance due to noise and other human activities, or losses and/or deterioration of habitat due to facility developments. Whether such effects would lead to permanent (irreversible) losses of whale resources is unknown.

d) Social Systems: Village subsistence practices could be affected irreversibly by the displacement of subsistence resources from locally-used customary habitat or by the reduction of resources through the modification of favorable habitat. The displacement could be irretrievable if the effect were maintained over time. Irreversible changes in cultural values and orientations could occur from the proposal, but the irretrievable nature of these changes to sociocultural systems is unknown.

A high growth situation could cause increased housing costs and shortages and could place extreme demands on utility services such as electrical power, water, sewage, and solid waste disposal. Attempts to provide basic service levels for the above items to meet increased population levels could force communities to delay improvements to the existing services.

Due to the increase in air and marine traffic generated by this alternative and the severely inclement weather to which the area is prone, it is highly probable that there would be an increase in transportation related fatalities over the life of the proposal.

e) Economic Systems: The only commitment that could be considered possibly irreversible and irretrievable would be the economic risk, resulting from OCS activity, of destruction of commercial fisheries resources or destruction of other fauna or flora used for subsistence by area residents.

f) Cultural Resources: The destruction of an underwater OCS cultural site would possibly result in an irreversible and irretrievable loss of prehistoric information about human occupancy.

b. Alternative I-2

Shumagin

Resource Category	Level of Expected Impacts* Scheduled Sales Only Under Alternative III-1	Cumulative Impacts of All Activities
1. General Impacts		
a. Coastal Ecosystems	n/a**	moderate
b. Water Quality and Supply		
Water Quality	n/a**	very high
Water Supply	n/a**	very high
c. Navigation and Shipping	n/a**	low
d. Other Uses of the OCS	n/a	n/a
e. Land Use	n/a**	low
f. Cultural Resources	n/a**	very high
2. Impacts of Special Concern		
a. Fish and Commercial Fisheries		
Fish Resources	n/a**	moderate
Commercial Fisheries	n/a**	moderate
b. Endangered Species	n/a**	moderate to high
c. Habitats and Resources of Special Concern	n/a**	moderate to high
d. Air Quality	n/a**	low
e. Recreation and Tourism	n/a**	low to moderate
f. Socioeconomic Factors	n/a**	very high
g. Native Subsistence Cultures	n/a**	moderate to high

* Definitions of level of impact are provided at the beginning of Section V.D.

** Differs from the proposal.

THE MORE SIGNIFICANT ENVIRONMENTAL CONSEQUENCES

Shumagin

Resource Category	Level of Expected Impacts* Scheduled Sales Only Under Alternative III-2	Cumulative Impacts of All Activities
1. General Impacts		
a. Coastal Ecosystems	n/a**	moderate
b. Water Quality and Supply		
Water Quality	n/a**	very high
Water Supply	n/a**	very high
c. Navigation and Shipping	n/a**	low
d. Other Uses of the OCS	n/a	n/a
e. Land Use	n/a**	low
f. Cultural Resources	n/a**	very high
2. Impacts of Special Concern		
a. Fish and Commercial Fisheries		
Fish Resources	n/a**	moderate
Commercial Fisheries	n/a**	moderate
b. Endangered Species	n/a**	moderate to high
c. Habitats and Resources of Special Concern	n/a**	moderate to high
d. Air Quality	n/a**	low
e. Recreation and Tourism	n/a**	low to moderate
f. Socioeconomic Factors	n/a**	very high
g. Native Subsistence Cultures	n/a**	moderate to high

* Definitions of level of impact are provided at the beginning of Section V.D.

** Differs from the proposal.

This alternative is identical to Alternative I-1 in every respect (resource estimates, infrastructure requirements, expected oilspills) except that only the most favorable geologic areas are offered and consequently only this acreage is leased and developed under Alternative I-2. The impacts are the same for this alternative as they are for the proposal as it is expected that the most favorable geologic areas (and only these areas) are expected to be leased and developed under both alternatives.

c. Alternative II

Resource estimates, attendant activities, and oilspill probabilities are the same for this alternative as for Alternative I-1. Thus, impacts resulting from this alternative would be the same as those described for Alernative I-1.

In terms of the contribution of this alternative to cumulative impacts, it is as described in Alternative I-1.

d. Alternative III-1

Discussion of general impacts, impacts of special concern, other management plans, unavoidable adverse impacts, the relationship between short-term use of man's environment and long-term productivity, and irreversible and irretrievable commitment of resources is not neccessary as no resources would be leased in the Shumagin area under this alternative. This alternative would cause no impacts.

The only impacts would come from other projects and proposals and tankering of oil from other proposed OCS areas. Cumulative impacts are as described for Alternative I-1. This alternative does not contribute to the cumulative impacts over the life of the proposal.

e. Alternative III-2

There are no direct impacts from this alterantive in the Shumagin planning area as no sales in the area are included in the schedule. Cumulative impacts remain as described under Alternative I-1 as it is assumed that eventually the resources will be developed. However, this alternative in the Shumagin does not contribute to the cumulative impacts.

f. Alternative IV-1.a

Resource estimates, attendant activities, and oilspill probabilities for this alternative are as described for Alternative I-1. Therefore, the impacts are as described in the proposal.

g. Alternative IV-1.b

Impacts from this alternative are identical to those described for the proposal and Alternative IV-1.a. as the resource estimates, infrastructure and expected oilspills are the same.

h. Alternative IV-2.a

Resource estimates, attendant activities, and oilspill probabilities for this alternative are insignificantly different from those described for Alternative I-1. Therefore, the direct impacts are as described in the proposal. Over the life of the action, the number of oilspills associated with tankering of oil from other OCS planning areas would be insignificantly different from Alternative I-1. Dropping the arctic sales, particularly the Barrow Arch sale, would result in lesser amounts of oil being transported by tanker through the Shumagin area over the life of the schedule. This reduction would result in a minimal reduction in the number of tanker spills. Thus, the overall contribution of the action to the cumulative impacts is slightly less with this alternative compared to Alternative I-1. The overall cumulative impacts are as descirbed in the proposal.

i. Alternative IV-2.b

Impacts from this alternative are the same as described in the proposal and for Alternative IV-2.a as the resource estimates, infrastructure, and expected oilspills are the same.

13. North Aleutian Basin

a. Alternative I-1

1) General Impacts

a) Coastal Ecosystems: The North Aleutian Basin planning area encompases important wildlife habitats for fish and birds with some of the world's largest concentrations of seabirds and waterfowl. Large oilspills, chronic oil pollution of food sources, air traffic, construction, drilling, and other OCS support activities could have a severe impact on this biologically sensitive area.

Izembek Lagoon which is located mid-shore in the proposed lease area has been designated as a National Wildlife Range. Izembek Lagoon is used by several million waterfowl, seabirds, and shorebirds for feeding in the spring and fall with many of these birds remaining in the area throughout the summer. A major portion, or perhaps the world's entire population of black brants, cackling Canada geese, Stellar's eiders, and spectacled eiders feed in this bay during spring and fall migration. A large oilspill in or near Izembek Lagoon during migration periods could have a severe impact on the bird populations and possibly eliminate most members of the four species mentioned above. Other biological resources would also be adversely affected.

Other important areas for seabirds and waterfowl include Nelson Lagoon, Amak Island, Walrus Island, and Cape Newenham. Walrus and Round Islands are important marine mammal habitats in the North Aleutian Basin. An important sea otter habitat is found along the Alaska Peninsula from Unimak Island to Port Moeller, including Unimak Pass and Amak Island. The bays of inner Bristol Bay are important habitats for beluga whales. Fish habitats of importance include all of the nearshore salmon habitat along Alaska Peninsula and Bristol Bay, the herring spawning and rearing areas of northern Bristol Bay and the king crab spawning and larval release area, offshore of the Alaska Peninsula from Unimak Island to Port Moeller.

Impacts to these habitats and the resources that inhabit them would vary from low to moderate. These impacts are discussed in the following sections (See V.D.13.a.2)a), b) and c)).

Conclusions. The level of expected impacts on the coastal ecosystems are low to moderate.

Cumulative Impacts. In the unlikely event that all areas of the North Aleutian Shelf planning area are leased and all resources subsequently are developed over the life of the proposal, the expected number of oilspills is 2.1 spills greater than 1,000 barrels and 0.9 spills greater than 10,000 barrels. An additional unknown number of oilspills is expected to result from tankering from Federal OCS lease sales in the Barrow Arch, Hope, Navarin, and Norton planning areas. from development of State of Alaska territorial waters in Hope Basin and Norton Sound, and from tankering of Canadian Beaufort crude. Additional projects or activities that would contribute to cumulative impacts in the planning area are tankering of oil from proposed onshore sales of the Bristol Bay Uplands (State) and Calista lands on the Yukon Delta. These total projects or activities would affect these critical habitats for fish, birds,

and mammals by substantially increasing the risk of oilspills contacting these areas. The cumulative impacts of these oilspill events, projects and activities are expected to produce a high level of impact to these habitats in the North Aleutian Shelf planning areas

In the unlikely event that all resources in the planning area are leased and developed, the alternative contributes about 57 percent of spills greater than 1,000 barrels and about 11 percent of spills greater than 10,000 barrels. These proportions are reduced significantly when the tankering from other Federal OCS planning areas (and State lease sale areas) are considered. Given these circumstances, the alternative contributes a minor portion to the total cumulative case. Consequently, the most important causal agent for potential cumulative impacts on coastal ecosystems is the tankering of oil from other existing and proposed state and Federal leases. The contribution of the alternative to cumulative impacts is small in either the case of only the resources described as developed or all resources leased and developed in the planning area.

b) Water Quality and Supply

Water Quality: Onshore impacts would be similar to those for the Gulf of Alaska under the proposal.

Offshore water quality of North Aleutian Basin is pristine. Impacts would be similar to those described for the Gulf of Alaska under the proposal. If predicted commercial quantities of oil and gas are found, 430 million barrels formation waters would be produced. The predicted numbers of spills of 1,000 barrels or greater is 1.2 and of 10,000 barrels or greater is 0.2. During the years of exploratory and developmental drilling, 13,600 cubic yards of drill cuttings and 40,800 barrels of drilling mud would be discharged. These discharges would decrease water clarity over 0.04 percent of the planning area. If formation waters are discharged, they would input an equivalent of 110,000 barrels of oil into basin waters as dissolved hydrocarbons.

In the absence of a major oilspill, offshore petroleum development would result in slight, chronic oiling of basin waters and loss of water clarity near permanent structures. A major spill would only contaminate waters adjacent to the spill and the effects on water quality would be short term.

Water Supply: Water supply facilities are limited or non-existant. Service facilities and housing for OCS development are assumed to be enclaved.

Conclusion. The effects on water quality from OCS activity in this area would be very low, except in the immediate vicinity of platforms. There are few development water systems to support OCS activity; consequently, new water supplies would have to be developed as a result, impacts on water supply would be high.

Cumulative Impacts. In the unlikely event that all potential oil and gas resources of the North Aleutian Basin planning area are leased and subsequently developed in a timely manner, the expected number oilspills is 2.1 spills of 1,000 barrels or more with 0.9 spills of at least 10,000 barrels. An additional unknown quantity of oilspills is expected to result from tankering from Federal OCS lease sales in the St. George Basin, Navarin Basin, Norton

Basin, Hope Basin, and Barrow Arch planning areas as well as from development of State of Alaska onshore and offshore reserves in Bristol Bay, Uplands, Norton Basin, and Hope Basin areas and from development of Native Corporation onshore reserves on Barrow Arch and North Aleutian areas. Oil industry development of all gas and oil reserves in the North Aleutian Basin planning area would result in discharge of 23,800 cubic yards of drill cutting and 71,400 barrels of drilling mud during drilling phases. Formation waters produced would total 720 million barrels over the life of the field. Additional projects or activities that could contribute to cumulative impacts in the planning area are increased commercial fishing and traffic. These projects and activities would affect water quality mostly by discharging fish wastes and increasing risk of fuel spills. The cumulative impacts of these oilspill events, discharges, and additional traffic are expected to produce a moderate impact to water quality in the planning area.

In the event that all resources in the planning area are leased and developed, in this alternative contributes 57 percent of spills greater than 1,000 barrels or more and 11 percent of spills of at least 10,000 barrels. This alternative would provide 56 percent of the cumulative impact to the planning area from drill cuttings, 56 percent of the impact from drilling mud, and 57 percent of the impact from fromation waters. The greatest threat to North Aleutian Basin water quality is from oil pollution.

The percentage of cumulative impact from oil pollution due to development is even lower when tankering from other Federal OCS planning areas, State, and Native Corporation proposed and the Canadian Beaufort leases are considered. The North Aleutian Basin planning area in this alternative contributes very slightly to the total cumulative planning area case. The most important causal agent for potential cumulative impact on water quality is oil pollution from transiting tankers carrying Federal OCS oil. The contribution of the proposal to the cumulative impacts is considered significant when only the resources described for this alternative are developed.

Cumulative Impacts. If all potential oil and gas resources of the North Aleutian Basin planning area were leased and developed, new water supply facilities would be required, causing very high impact. Other cumulative impacts are expected from Federal OCS oil development in the St. George Basin, State and private onshore oil development in Bristol Bay, fisheries development, and general commercial development. The sum effect of these additional impacts is likely to be very high. It is unlikey that the proposed action in this planning unit under this alternative would constitute a major portion of total water supply needs.

c) Navigation: Vessel traffic within the North Aleutian Basin is largely composed of fishing vessels and can be seasonally heavy. The two sales proposed for the planning unit would result in the establishment of two platforms. Properly marked and lit, it is unlikely that these two platforms would cause a navigational hazard to fishing vessels. In regard to product transportation, a favored method by which the produced hydrocarbons will be transported to market will feature a pipeline constructed across the Alaska Peninsula to an ice-free deep water port. If this method is utilized then navigational impacts of these two sales will be virtually nil.

Conclusion. The probability of navigational impact is very low.

Cumulative Impacts. Current major projects forecast for the North Aleutian, which may influence traffic levels within the area, are related to pending State lease sale No. 41, the increasing development of the Southern Bering Sea bottomfishing industry and tankering associated with proposed lease sales in the Barrow Arch, Hope, Norton, Navarin, and St. George areas and the Canadian Beaufort crude. Tankers are expected to go through Unimak Pass.

OCS support and product transportation traffic related to field development of the North Aleutian Basin would, in all probability, at its peak equal less than five percent of all traffic within the planning unit. Indeed, given the pending expansion of the bottom-sea fishery, future OCS related traffic for both the cumulative and mean resource cases of the proposed action would be expected to be negligible. Overall OCS impacts to navigation systems are expected to be low to very low.

d) Other Uses on the OCS: This area is heavily used by commercial and subsistence fishermen. Conflicts to these resources are described in the appropriate sections, below.

Conclusion: No impacts. (The main uses of the OCS in this area are subsistence hunting and fishing and commercial fishing, addressed in other sections.)

e) Land Use: The closest large-scale infrastructure to the proposed sale area is at Cold Bay, accessible by water from the south side of the Alaska Peninsula. King Cove (a first class city) is the only other settlement in the area. The proposal assumes an enclave development in the Cold Bay vicinity, most likely along the south side of the Alaska Peninsula east of Cold Bay. An oil terminal, LNG plant and service/supply base would be included in the enclave. A docking facility on the south side of the peninsula would allow access to tankers for transporting products southward.
The enclaves is expected to occupy 175 acres of land.

The enclave would eliminate conflicts with local land use, but may cause some impact on land resources because of its location on previously undeveloped land. The pipeline corridor will temporally disturb, habitats for birds and other animals.

Conclusions. Since this area is mostly undeveloped, impacts on existing land use would be low. Developing new facilities in the area will cause localized land use changes and some temporary disturbances, such as laying a trans-Alaska Peninsula pipeline, if feasible.

Cumulative Impacts. The project that will affect land use in the Alaska Peninsula area is the Bristol Bay Cooperative land use management plan. This plan should affect land use in following ways: land ownership and land use will be largely dictated by the outcome of this plan; it will establish transportation corridors, resource zones, industrial areas, etc.; it will also clearly define and resolve land ownership and use conflicts between various public and private agencies. It is expected that additional land use impacts associated with the proposal would affect 175 acres of land, because of the need for oil and/or gas terminal facilities, material support base warehouses, and other infrastructure. OCS development would result in very minor (low)

changes in land use. The area is relatively unpopulated. In consideration of the acreage involved, the changes would be insignificant.

For the total development of resources in the area, land use impacts would affect 450 acres of land because of the need for airport facilities, an oil or gas terminal, warehouse facilities, living quarters, a large material support base and docking facilities. The maximum resource development would result in very major changes in land use from undeveloped land (wilderness) to developed. The area is completely undeveloped. Considerating its present wilderness state, the required acreage would generate a minor impact.

f) Cultural Resources: Adverse impacts on cultural resources along the Alaska Peninsula are likely as a result of exploration and development activities. Many cultural sites such as the Hot Springs Site at Port Moller lie on low flats which at high tides could be adversely impacted by oilspills and oil-related activities. The Hot Springs site is important for the prehistoric remains of houses and for knowledge of prehistoric subsistence obtained from the study of shell middens on the site. Adverse impact on these sites and on unknown sites along the same Alaska Peninsula shoreline would be likely to occur without stipulations to protect these cultural resources.

Conclusions. Impacts on offshore cultural resources will be low. Impacts on onshore sites would be low to moderate, as these are numerous known on suspected sites and adjacent to the area. Overall, impacts to cultural resources are expected.

Cumulative Impacts. In the unlikely event that all resources subsequently are developed over the life of the proposal, the expected number of oilspills is 2.1 spills greater than 1,000 barrels and 0.9 spills greater than 10,000 barrels. An additional unknown quantity of oilspills is expected to result from tankering from Federal OCS lease sales in the St. George, Navarin, Norton, Barrow Arch, and Hope planning areas as well as from development of State of Alaska territorial waters in Bristol Bay and the Canadian Beaufort. Additional projects or activities that could contribute to cumulative impacts in the planning area are onshore oil and gas development, Bristol Bay Cooperative Management Plan tankering through Unimak, and Bristol Bay Fisheries. These total projects or activities could affect cultural resources negatively in the following ways: population impacts, looting, oiling of artifacts, and positive impacts such as increased information from surveys. The cumulative impacts of these oilspill events, projects, and activities are expected to produce a moderate impact to cultural resources in the North Aleutian planning area.

In the unlikely event that all resources in the planning area are leased and developed, the alternatives contributes 57 percent of spills greater than 1,000 barrels and 11 percent of spills greater than 10,000 barrels caused by OCS activities in the planning area. When the tankering from other Federal OCS planning areas, the Canadian Beaufort and State lease sale areas (to an unknown extent) are considered, the alternative contributes moderately to the cumulative impacts. The most important causal agent for potential cumulative impacts on onshore cultural resources is increased population in the region not related to OCS development. The contribution of the proposal to cumulative impacts is insignificant when only the resources described for this alternative are developed and when total resource development is considered as part of the cumulative case.

2) Impacts of Special Concern

a) Commercial Fisheries

(1) Commercial and Subsistence Fish Resources: The important commercial fish resources of the North Aleutian Shelf planning area include all five species of Pacific salmon, king and Tanner crab, Pacific herring, halibut and several species or groups of bottomfish (blackcod, walleye pollock, Pacific cod, Yellowfin sole, and flounder). Of special concern are the highly productive sockeye salmon fisheries in inner Bristol Bay and the herring fisheries in the Togiak region of northern Bristol Bay. Subsistence fisheries tend to rely more heavily on salmon, and to a lesser degree on crab and other shellfish. Impacts to these resources would result from accidental oilspills and discharge of drilling effluents and wastes.

Over the life of the proposal, 1.2 oilspills greater than 1,000 barrels and 0.1 oilspills greater than 10,000 barrels are expected to result from Alternative I-1. Oilspills can impact fish populations by causing short-term acute impacts or long-term sublethal impacts. Since most oil remains at or near the surface, species that are most vulnerable are those that inhabit the surface layer or shallow nearshore at least some time during their life cycle. These species include salmon (adult and juvenile of all five species, and egg and larvae of pink and chum salmon), herring (all life stages), crab (larvae of all species), and several species of demersal fish (eggs and larvae).

Salmon: Adult salmon (all five species) would be vulnerable to oil contamination if a spill contacted areas in or near the mouths of rivers during or preceding periods when these fish are congregating near river mouths prior to migrating up river to spawn. Along the Alaska Peninsula and in the bays of inner Bristol Bay (Ugashik, Egegik, Kvichak, Nushagak, and Togiak) the period of greatest vulnerability for adult salmon is from late May through early August. Smolt would be susceptable to adverse impacts in the same areas during out-migration or in nearshore areas during their first few months in the marine environment. Pink and chum salmon would be vulnerable during all life stages as these species spawn intertidally to some degree. Vulnerability of any of the five species would vary depending on the timing of th spawning or out-migration of a particular population. All five adult species in this planning area exhibit a period of vulnerability (spawning period) of approximately three to four weeks. This period of vulnerability occurs between the months of May and September. Very little is known about the movements of juvenile salmon. They make coastwide movements, feed and grow in the intertidal, and move offshore over a period of several months.

It it is assumed that an oilspill contacts a nearshore area, especially off the mouth of a salmon stream, several impacts could occur. These impacts could be any of a variety of lethal or sublethal toxic responses, or the loss of fish prey organisms. Adult salmom are highly mobile, and some evidence suggest that this life stage could detect and avoid toxic levels of aromatic hydrocarbons in solution (Weber et. al., 1981). Therefore, the major concern seems to be that these adults would avoid areas of contamination, which if found off the mouths of major spawning rivers could result in delays in spawning runs or actual blockage of the river or stream. Given the fact that oilspills in the marine environment generally result in concentrations less than those which have

proven toxic to adult salmon (Malins, 1977), it is quite unlikely that this type of impact would occur. Even if toxic concentrations did occur, these concentrations would not remain long in marine waters, especially off the mouth of major rivers where mitigation and dilution would occur rapidly.

Salmon smolt on the other hand would perhaps be more vulnerable, in that they would remain in nearshore waters for longer periods while they feed and grow in preparation of movements farther offshore. However, like the adult salmon juveniles appear to possess the ability to detect toxic concentrations of petroleum hydrocarbons (Maynard et al., 1981). If this is the case, then oilspills in the nearshore could possibly be avoided to some degree by this life stage. Additionally, as stated above, toxic concentrations in the range of concern (5-15 parts per million [Maynard et al., 1981] of aromatic hydrocarbons) would not be expected in marine waters. However, considering that a spill could remain several days or several weeks in coastal waters, portions of a population may be subject to prolonged stress from sublethal effects.

The eggs and larvae (early life stages) of pink and chum salmon that occur in marine intertidal areas would be the most vulnerable life stage of these animals. It would be difficult to quantify the impacts to a local salmon fishery from oilspill contamination in a spawning or larval rearing area. However, it is possible that a large portion of eggs and larvae could be lost. The gravity of this loss, however, becomes somewhat masked when one considers that natural mortality of eggs an larvae may be as high as 75 percent for each of these life stages. The difficulty would be in ascertaining what percentage of those lost from oil pollution would have died naturally. It is possible that most of a year class from a local population could be lost. When considering the large annual fluctuations in these species, however, this may not always be significant. Generally, though the loss of a year class is not a desirable effect. It can significantly reduce later year population levels.

Given the extremely low number of expected spills, and the narrow periods of vulnerability at least for the adult salmon, it is unlikely that an oilspill would contact important nearshore areas during the period when salmon are present. The level of impact to a local pink or chum population could be high as a result of oil contacting an important spawning and larval rearing intertidal area. The overall leve of impact on salmon for the North Aleutian Shelf region however, would be low.

Shellfish: Both species of crab (tanner and king) have similar life histories in that adults spend the winter months in deep water (150-400 m) and migrate to shallow (6-20 m) waters in the spring and summer to spawn. During this period, the eggs which have been carried by the female since the previous spawning period hatch and become free swimming planktonic larvae. Spawning and rearing areas are generally offshore from the Alaska Peninsula from Unimak Island to Port Moeller.

Distribution of these most sensitive larval form is generally widespread, and therefore, would be the most susceptible to contact by an oilspill. The likelihood of such an interaction then, is high at least once during the life of the field. However, even in the case of a very large spill (10,000 barrels or greater) in this region, only an insignificant percentage of crab larvae would be contacted by concentrations of oil (1-10 ppm) that would cause

mortality. Therefore, the level of impact on crab larvae is expected to be low for regional populations.

Another effect on crab populations may result from oil sinking to the bottom and contacting aggregations of adult or juvenile crab or by contaminating large areas and affecting their food supply. There is greater opportunity for this phenomenon in shallower, nearshore waters where adult and juvenile crab spend lengthy periods. The likelihood of such an event is somewhat less than contact to the larval stages however, given the broad distribution of crab populations (most of the southeast Bering Sea). Adult and juvenile crab are less vulnerable than larval stages the level of impact to these life stages on a regional basis is low. Local crab populations in nearshore waters could, however, suffer at least one short-term decline if their habitat is affected.

Herring: Herring are most vulnerable from oilspills as spawning adults, eggs, and larvae: these life stages occur almost exclusively in nearshore waters. In May and June herring of this region move into the nearshore areas of northern Bristol Bay near Togiak to deposit their eggs on vegetation (kelp and eelgrass) or rocky substrate. Eggs hatch within a month and larvae spend about two months in nearshore waters prior to changing into juveniles and moving offshore.

If an oilspill did contact one of the spawning areas during the spawning or larval rearing period, it is possible that adverse consequences to the local herring population would occur. These consequences could include egg or larval mortalities, contamination of spawning substrate, loss of organisms upon which larval herring feed, and adult mortalities. It is possible that a year class from the impacted area would be lost as a result of this impact. The extent of these losses would depend on many factors, with the size of spill and size of the affected area being the greatest determinants. It is also possible that only a portion of the spawning population, eggs, or larval herring would be affected in a given area. Given that extreme environmental conditions (i.e., shortage of food supply, storms, etc.) cause extremely high egg and larval mortality (as high as 99 percent for larvae and 60 to 90 percent for eggs (Smith, 1976)), the loss attributable to an oilspill could be extremely small.

However, the loss of a local year class would not be expected. The expectation level of impact to the regional herring biomass would be low.

Demersal Fish: Demersal species including halibut would be less affected by an oilspill than any other species group. The most vulnerable species are those which have egg or larval forms that inhabit surface or nearshore surface waters. Important species in the North Aleutian Shelf planning area which display this characteristic are halibut, cod, yellowfin sole, flounder, and pollack. Because fish eggs and larvae are relatively sensitive to hydrocarbon contact, and because of the broad distribution of these life stages throughout the region it is likely that the one oilspill would result in a low ecological loss to these species. The level of impact on a regional basis, would be low.

Several types of discharges and effluents could be released during OCS oil and gas activities. OCS Operating Orders prohibit disposal of any waste materials into the ocean that will create conditions which will adversely affect aquatic life. Disposal of waste materials is regulated by the Environmental Protection Agency. Of concern are drilling muds because very little is known about their

long-term, chronic impacts. There are indications that these muds could produce elevated trace metal concentrations in marine organisms and interfere with reproductive processes. However, given that only 14 exploratory and 54 production wells are projected for this alternative, a relatively small amount of effluent material would be discharged, (Section V.D.13.a.1)b) and a small demersal area would be affected. Therefore, impacts to fish and shellfish are expected to be very low.

Conclusion. Fish and shellfish that occupy surface and nearshore waters at least some portion of their life history are expected to suffer low ecological losses. Local impacts to pink and chum salmon, and king crag could be high but these animals would recover rapidly. Overall, regional impacts to fish and shellfish would be low.

Cumulative Impacts: In the unlikely event that all tracts in the Northern Aleutian Basin are leased and developed during the life of the proposal, the expected number of oilspills is about 2.1 for spills greater than 1,000 barrels and about 0.9 for spills greater than 10,000 barrels. Additionally, tankering of oil through the North Aleutian Shelf planning area would occur as a result of the proposed Federal sales (Barrow Arch, Hope Basin, Norton Basin, Navarin Basin and St. George and a State sale (Norton [Sale 38] and Hope Basin [Sale 45]) and Canadian Beaufort oil development. An unknown number of spills is expected to result from this tankering. Considering the resource estimates (total resources developed) of these proposed sales, it is possible that over 3 billion barrels could transit the North Aleutian Shelf area via tanker. This would significantly increase the oilspill risk to this area.

Given this increased number of expected spills, it is possible that one large spill may follow another, or that spills may occur in subsequent years in the same area. Therefore, the cumulative impact of these oilspills on fish populations probably would cause moderate ecological losses to fish or shellfish populations that inhabit surface or nearshore waters at least some time during their life cycle. Of primary concern would be the salmon and crab populations which occur along the north side of the Alaska Peninsula which would be nearer the tanker traffic pattern through Unimak Pass.

Fish populations are also stressed by commercial fishing pressure which combined with the cumulative oilspill impact could result in moderate ecological loss to certain species (primarily salmon) unless management action (i.e., area closures) is taken to relieve the harvest pressure. Overall, the expected regional impacts on fish populations due to the cumulative impacts is moderate.

The proposal contributes about one third of all oilspills and does not contribute significantly to the other impact agents. When compared to the non-OCS-related impacts (tankering and fish harvest pressure), the contribution of the proposal is low. The contribution of this alternative when only the resources described in the alternative (as opposed to total development of OCS resources) would be slightly less.

(2) Impacts on Commercial Fisheries: The North Aleutian Shelf region including Bristol Bay comprises one of the most valuable commercial fishing areas in Alaska. In 1979, over 217 million pounds of fish (primarily salmon) and shellfish worth over $190 million to commercial

fishermen were landed in this region (Terry et. al., 1981). This represents slightly less than one-third of the total Alaska landings. Of special concern are the highly productive sockeye salmon fisheries of the Alaska Peninsula (Izembek Lagoon, Bear River, and Sandy River) and Bristol Bay (Ugashik, Egegik, Kvichak, Nushagak, and Togiak fishing districts). For the purpose of this analysis, a high economic impact on any commercial fishing industry results when there is a ten percent or greater economic loss to that industry. A moderate economic impact results when there is an economic loss of less than ten percent. A low economic loss results when there is a small economic loss to the industry. It should be noted however, that the loss to individual fishermen probably will be more serious than the loss to industry.

Impacts on commercial fisheries under the proposal would result largely from competition for labor, ocean space use conflicts, competition for infrastructure services, and reduced catch due to ecological loss (as discussed above). This analysis (except for reduced catch) draws largely from Tobolski et. al., (1981), which provides an analysis of fishing industry impacts in the Bering Sea.

Over the life of the proposal, about 1.2 oilspills greater than 1,000 barrels and 0.1 oilspills greater than 10,000 barrels are expected to result from Alternative I-1. Since fish resources are expected to sustain low ecological losses (see discussions in Section V.D.13.a.2)a)(1), the commercial fishing industry could sustain low economic losses because there would be a loss in potential catch. These potential impacts are expected to be short-term in duration, and only occur once during the life of the field given the low number of expected spills.

A large oilspill, especially in one of the important Bristol Bay fisheries could impact commercial fishing by causing a disruption in space and time. It is unlikely that commercial fishermen will harvest in the area of an oilspill because 1) their boats and gear may be contaminated, 2) they may be restricted from the contaminated area while clean-up efforts are underway, and 3) direct coating and incorporation of petroleum hydrocarbons can cause tainting of marine organisms, rendering them undesirable or unmarketable. This disruption in fishing would affect the nearshore salmon and shellfish fisheries to a greater degree than the offshore demersal fish fisheries. In the unlikely event that a large oilspill contacted this area during the height of the fishing season (varies by species) a moderate to high impact would result on the local fishery (especially on the salmon fishery). Regional economic impacts, however, would be low, because such an event would have to occur during a narrow time window (June-July for Bristol Bay salmon) which reduces the probability of occurance.

A big portion of fishery related labor in the region of interest is made up of fishermen whose earnings are lower than the wage paid to unskilled workers in the oil and gas industry. This is likely to lead to a high willingness of this labor pool to transfer to OCS employment. However, because there exists a considerable excess in the number of crewman available for fishing jobs, the impact due to labor competition would be very low.

Ocean space use conflicts consists of loss of and damage to fishing gear, loss of access to fishing grounds, and collisions among vessels. Fishing gear conflicts may result from: 1) oil fouling of gear (as stated above), 2)

catching or "hanging" gear (trawl nets or scallop dredges) on obstructions such as pipelines and bulk material inadvertantly discarded by industrial operations, 3) and vessel traffic and seismic operations (trailing long seismic cables) in areas where pot-fishing (crab) and longlining (halibut) occur. Secondary economic impacts from gear conflicts occur from fishing time lost while waiting for repair or replacement of gear. This may be especially acute in these remote areas in Alaska where replacement gear must be shipped from distant suppliers and transportation services are limited.

The analysis for St. George Basin (Tobolski, 1981) which projected the number of gear damage/loss claims that would be submitted as a result of oil and gas development concluded that there would be 5 claims ($90,000 in 1980 dollars) per year initially increasing to 12 claims ($216,000 in 1980 dollars) per year full development. These results were based on the estimated future fishing effort and the projected number of oil and gas installations (platforms) with claim frequencies established for these parameters from North Sea historical data. Given that the intensity of fishing and OCS development is anticipated to be greater in the St. George Basin than in the North Aleutian Basin, the number of claims should be less. Even if the St. George figures are assumed, this would represent a total economic loss of about 0.1 percent to the regional fishermen. However, this may represent a very high loss to individual fishermen.

The emplacement of two platforms in the planning area would result in a loss of access of fishing grounds in the amount of 157 hectares (considering a 500 meter buffer radius for the platform). This represents an insignificant loss to the fishing industry.

Attempts by domestic fishermen to exploit the hitherto foreign dominated demersal fish resources will introduce new vessel traffic in the planning area. Similarily, the OCS supply and support vessels will bring additional traffic leading to increased chances of vessel collisions. However, the analysis for the St. George Basin (Tobolski, 1981) concluded that only one collision would be expected in 20 years due to increased OCS vessel traffic. Given that OCS development in the North Aleutian Basin planning area will not be as heavy as St. George, it is safe to assumes that one vessel collision would be the upper limit for the life of the proposal. Such a collision may render only slight to moderate damage or even a complete loss (sinking) of one or both of the vessels involved. If the latter is the case, especially for a larger vessel (catcher-processor), the impact to the fishing industry could be moderate considering the 20 year life of the field.

The most likely damage, however, would be much less, because most collisions do not involve sinking or total loss of equipment. Statistics of casualties in U.S. waters show that the average value lost per vessel involved in a collision is approximately $22,137 (1980 dollars). If a fishing vessel is involved in a collision during the life of the proposal, then the annual loss equivalent would be $1,107. The expected level of impact to the fishing industry, therefore, is very low.

The impacts from competition for infrastructure services would vary depending on the location of OCS development. In this region these impacts would most likely occur in the vicinity of Unalaska or Cold Bay. The case of Unalaska competition for these services would be expected. However, given the low-level

of OCS activity under this alternative, such conflicts would not be severe and impacts would be low. The impacts from the Cold Bay scenario would be beneficial for the fishing industry (refer to Section V.D.12.a.2)(a)(2)).

Conclusion. As a result of the proposal the expected level of impact on the commercial fishing industry in the North Aleutian Shelf planning would be low. The loss to individual fishermen, however, would be high.

Cumulative Impacts. As previously noted the cumulative impacts on fish resources (salmon, herring, crab) in the North Aleutian Basin would be moderate. This would result from the increased number of expected spills that result from the tankering of oil from the Canadian Beaufort and from Federal and State leases to the north. As a result of this moderate ecological loss the fishing industry would be expected to sustain a moderate economic loss. The proposal itself in the area does not contribute significantly. The implementation of the proposal for all acreage may, however, be a major contributor.

Because full development of the planning area would not substantially increase OCS activities, other fishing industry impacts (i.e., competition for infrastructure services, ocean space use conflicts, and competition for labor) would not increase significantly are the major contributors to impacts on the industry along with tanker spills. The level of impact to the fishing industry from cumulative impacts would be moderate.

b) Endangered Species: The same endangered species that are common to or may occur in the St. George Basin also are common to or may occur in the North Aleutian Basin (see discussion under Alternative I-1 for St. George Basin). The endangered species most likely to be affected by oil and gas development in this basin is the gray whale. Other endangered whale species and the two endangered avian species (see discussion under proposal for St. George Basin) are very unlikely to be significantly effected by oil and gas development in the North Aleutian Basin. If nearshore tracts (within 12 miles of the coast that are adjacent to the gray whale migration corridor) are leased, and explored under this proposal, the chances of interaction between gray whales and oilspills is very high.

On January 22, 1982, the BLM and the USGS received a Biological Opinion prepared by the National Marine Fisheries (NMFS), pursuant to Section 7 of the Endangered Species Act of 1973, concerning the impact of OCS leasing and exploration activities on endangered whales in the Bering Sea region. Based on their evaluation of the available information concerning the biology and distribution of endangered whales, and the nature, extent, and location of the full range of OCS activities likely to take place in the region, the NMFS concluded that there was insufficient information to make a reliable determination concerning the likelihood of jeopardizing the continued existence of these whales. However, the NMFS concluded further that it is possible for the Department of the Interior to plan OCS exploratory activities in the Bering Sea region so that they are not likely to jeopardize the continued existence of endangered whales. Additional consultations will take place prior to production and development activities in the region or a additional sale proposals are developed in the various Bering Sea Planning Areas.

The complete text of this Biological Opinion can be found in Appendix G of the Final Environmental Impact Statement for Proposed Oil and Gas Lease Sale No. 57 in the Norton Sound.

Conclusion. The impacts on endangered species in the area is expected to be moderate. The definitive effects of OCS activities on endangered species are unknown.

Cumulative Impacts. In the unlikely event that all potential oil and gas resources of the North Aleutian planning area are leased and all resources subsequently are developed over the life of the field, the expected number of oilspills is 2.1 spills greater than 1,000 barrels and 0.9 spills greater than 10,000 barrels. An additional unknown quantity of oilspills is expected to result from tankering from Federal OCS lease sale in the Bering and Arctic planning areas as well as from development of State of Alaska territorial waters along the Yukon Delta and from the Canadian Beaufort. An additional activity which could contribute to cumulative impacts in the planning area is commercial fishing. These total projects or activities could effect marine mammals through oilspills, disturbances, and commercial harvest of food sources. The cumulative impacts of these oil spill events, projects and activities are expected to produce a moderate to high impact to endangered whales in the North Aleutian planning area. Birds will experience low-level impacts from this activity.

In the unlikely event that all resources in the planning area leased and developed, the alternative contributes 57 percent of spills greater than 1,000 barrels and 11 percent of spills greater than 10,000 barrels. These proportions are greatly lowered when the tankering from other Federal OCS planning areas and State lease sale areas (to an unknown extent) are considered. In the case oil from North Aleutian leasing contributes little to the The most important casual agent for potential cumulative impact on endangered whales is tankering from other Federal lease sales and the Canadian Beaufort. The contribution of the proposal to teh cumulative impacts in the North Aleutian planning area is considered significant when only the resources described for this alternative are developed and total development is not considered in the cumulative impacts. The contribution of the proposal to the cumulative impacts is considered insignificant however, when all resources in the planning area are developed as part of the cumulative consideration. This is true regarding to impacts to both endangered whales and endangered birds.

c) Habitats and Resources of Special Concern:

More than 1.4 million highly vulnerable seabirds (about 80% of the total seabird nesting population for the planning area) and the entire world's population of black brandt occur in the North Aleutian Basin planning area. A large sea otter population (over 17,000) occurs along the north side of the Alaska Peninsula in the southern part of this planning area and sizeable populations of harbor seal and sea lion occur there. Northern fur seal, walrus, bearded and ringed seals also occur seasonally in this area. Habitats of special concern for the above species in this planning include Izembek Lagoon as a critical feeding habitat for the entire world's population of black brandt, Unimak Pass migration corridors for marine mammals, Cape Newenham and Cape Pierce-major seabird colonies, and Walrus Islands, Amak Island, Nelson Lagoon, and Port Moller- mitigation corridor for marine mammals and birds. The entire Bristol Bay is very rich in marine mammals and is highly

productive. Thus, the entire North Aleutian Basin planning area is a habitat and resource area of special concern. The major adverse impacts of OCS activities from the proposal could come from oil pollution of the marine environment and man-made disturbance.

The species most likely to be significantly affected by potential oilspills as a result of OCS oil and gas activities in the Northern Aleutian Basin are diving seabirds such as murres, auklets, puffins, and guillemonts and marine waterfowl such as black brandt, eiders, and other sea ducks. These species are very likely to suffer high mortalities if a major spill occurs in this area. Highly vulnerable sea otter and fur seal populations also may suffer substantial mortality in the event of a major oilspill.

Conclusions. Because of the importance of the North Aleutian planning area to large and vulnerable population of: 1) seabirds and waterfowl, 2) sea otters, and 3) fur seals, impacts on habitats and resources of special concern are expected to be moderate.

Cumulative Impacts: In the unlikely event that all potential oil and gas resources of the North Aleutian planning area are leased and all resources subsequently are developed over the life of the field, the expected number oilspills is 2.1 spills greater than 1,000 barrels and 0.9 spills greater than 10,000 barrels. An additional unknown quantity of oilspills is expected to result from tankering from Federal OCS lease sale in the Bering and Arctic planning areas as well as from development of State of Alaska territorial water along the Yukon Delta and the Canadian Beaufort. Additional projects or activities could contribute to cumulative impacts in the planning area are commercial fishing, and onshore oil and gas leasing. These total projects or activities which could effect birds through oilspills, disturbance, and commercial harvest of food sources. The cumulative impacts of these oil spill events, projects and activities are expected to produce a moderate to high impact to birds in the North Aleutian planning area.

In the unlikely event that all resources in the planning area leased and developed, the alternative contributes 57 percent of spills greater than 1,000 barrels and 11 percent of spills greater 10,000 barrels. These proportions are greatly lowered when the tankering from other Federal OCS planning areas, the Canadian Beaufort (and State lease sale areas to an unknown extent) are considered. Here oilspills from North Aleutian leasing contribute little to the total cumulative case. Consequently, the most important causal agent for potential cumulative impacts on birds is tankering from other Federal lease sales. The contribution of the proposal to the cumulative impacts in the North Aleutian planning area is considered insignificant, however, when all resources in the planning area are developed and considered as part of the cumulative impacts. However, when total development of the resources is not considered, the contribution of the proposal is significant. The same may be said regarding the marine mammals in this planning area.

d) Air Quality:

It is estimated that 14 exploratory wells will be drilled to identify the resources and 43 development/production wells and 2 platforms to develop the resources under this alternative. It was assumed for the purposes of analysis, that production from an average platform would be 5.0

million barrels of oil and 21.7 billion cubic feet of gas per year. The resources are assumed to be transported through subsea pipelines to shore and then by tanker to ports southward. Estimated representative emission for exploration/development are provided in Table V.D.13.a.2)d)-1. This information is derived from Table I.V.A.3-1.

Table V.D.13.a.2)d)-1.
Estimated Representative Emissions

Activity	Production at Platform (tons per year)				
	VOC	NO_x	TSP	SO_2	CO
Oil/Gas	24	350	--	0.4	132
Barging	None	---	--	---	---

OCS facilities located within 20 miles of the shore will require some emission controls. It is likely that one or both of the projected platforms will be sited in this near-shore area. One new gas processing plant may be required for the development of resources associated with the proposal and will be located on the south side of the Alaska Peninsula.

A low qualitative impact is expected from routine emissions. The area is in attainment for all pollutants. Some impact will occur from near-to-shore OCS facilities (platforms). If a blowout, oilspill, or fire were to occur near shore, short-term violations of several NAAQS could occur, depending on the type and duration of the accident.

Any emission sources which would adversely affect the onshore air quality would be subject to mitigation required by EPA and the State, if located onshore, or by DOI, if located on the OCS. ERG (1981) discusses mitigation measures for OCS facilities.

Conclusions The level of impacts to air quality is expected to be low.

Cumulative Impacts. It is estimated that a total of 0.5 billion barrels of oil and 2.2 trillion cubic feet of gas exist in the entire North Aleutian Basin Federal OCS planning areas. In the event that total development of all Federal reserves occurs over the life of this proposal, 3 new platforms with 10 wells would be required. It is very unlikely that this magnitude of development will occur over the life of this proposal.

The major influencing factors affecting the onshore air quality near the planning areas as a result of this development are 1) the number of new wells drilled, 2) the location of the platforms, 3) the timing of the activities and 4) the instantaneous local meteorological conditions. The offshore development of the proposal contributes moderately to regional cumulative air quality.

The increase in oil and gas development described in the proposal will occur as the onshore areas in the region are experiencing some non-OCS related population and industrial growth. Other major sources of air emissions are the proposed Southwest Bristol Bay Uplands oil and gas sales, fishing industries, and marine transportation industry. There activities affect local cumulative

air quality but will not lead to violation of any ambient air quality standards. In most cases, oil and gas activities will be a moderate portion of the overall growth. The cumulative impact of the overall growth will increase ambient air pollutant concentrations, but not significantly. The cumulative regional air quality impacts are expected to be low. This is the case whether all resources are developed in the Alaska regions or only the resources described under the proposal are developed within the 30 year life of the proposal.

e) Recreation and Tourism: Many firms are entering the recreation and tourism business here because of its attractions. The prospect of oil exploration and development has generated the Bristol Bay Cooperative Management Plan, which plays an important part in State and Federal activities. Adverse impacts from oil related activity on recreation and tourism are likely to be significant in Iliamna, the Naknek River, Dillingham, and other Bristol Bay areas.

Conclusions. Impacts are expected to be low to moderate in this planning area.

Cumulative Impacts. In the unlikely event that all areas of the North Aleutian planning area are leased and all resources subsequently are developed over the life of the proposal, the expected number of oilspills is 2.1 spills greater than 1,000 barrels and 0.9 spills greater than 10,000 barrels. An additional unknown quantity of oilspills is expected to result from tankering from Federal OCS lease sales in the Bering and Arctic planning areas as well as from development of State of Alaska territorial waters in along the Yukon Delta. Additional projects or activities that would contribute to cumulative impacts in the planning area are onshore oil and gas development, Bristol Bay Cooperative Management Plan of tankering through Unimak, and Bristol Bay fisheries. These total projects or activities could affect recreation and tourism negatively by straining recreational resources as increased information from surveys. The cumulative impacts of these oilspill events, projects, and activities are expected to produce a moderate impact to recreation and tourism in the North Aleutian planning area.

In the unlikely event that all resources in the planning area are leased and developed, the alternative contributes 57 percent of spills greater than 1,000 barrels and 11 percent of spills greater than 10,000 barrels caused by OCS activity in the planning area. When the tankering from other Federal OCS planning areas and State lease sale areas (to an unknown extent) are considered, the alternative contributes moderately to the total cumulative impacts. Consequently, the most important causal agent for potential cumulative impacts on recreation and tourism is increased population pressure in the region not related to OCS development. The contribution of the proposal to the cumulative impacts in the North Aleutian planning area is considered significant when only the resources described for this alternative are developed. The contribution of the proposal to the cumulative impacts is considered insignificant, however, when all resources in the planning area are developed.

f) Socioeconomic Factors: The probability of the discovery of commercial quantities of petroleum resources in the North Aleutian Basin OCS area is considered to be 42 percent, and the mean estimates of

discoveries expected to result from the proposed 5-year leasing program are 270 million barrels of oil and 1.3 trillion cubic feet of natural gas.

Most petroleum workers in the area would probably live in isolated dormitories during work periods, and would commute during frequent rest periods to permanent residences in other regions of Alaska or out of State. Most in-state commuters would reside in the Anchorage region. The long-term employment impact resulting from the proposed 5-year leasing program would total about 400 jobs statewide, and the corresponding population impact would be about 800 new residents in Alaska.

Cumulative Impacts. In the unlikely event that all areas of the North Aleutian Shelf planning area are leased and all resources subsequently are developed over the life of the proposal, the total cumulative impacts on resident employment and population in the affected parts of the adjacent land areas (Aleutian Island census division) during the years 1980-2000 would be very high in the sense that potentially significant long-term stress on public and private services and facilities can be expected, resulting from extremely large expected increases in resident employment and population. The largest expected increases will result from non-OCS activities, although OCS activities will also generate very large employment and population impacts.

The principal non-OCS activity expected to result in employment and population growth will be the rapid expansion of the U.S. bottomfish industry, which is expected to largely displace the huge foreign bottomfish operation in the area by the year 2000. Impacts from the U.S. bottomfish industry expansion are expected to increase total employment and population in the entire Aleutian Islands census division by 100 to 400 percent. Impacts on the key community of Unalaska/Dutch Harbor are estimated to increase resident employment and population by 300 to 1000 percent, by the year 2000. Bottomfish development is expected to account for well over half of the cumulative impacts in the Aleutian Islands census division.

OCS activities in the St. George, Navarin, Norton Basin, and as many as seven other OCS planning areas will also contribute to employment and population growth in the Aleutian Islands census division. Although the combined impacts from these other OCS activities could be quite large relative to the existing (1980) levels of employment and population, their combined impacts are expected to be less than the impacts expected from expansion of the U.S. bottomfish industry.

OCS activities in the North Aleutian Shelf area will have important impacts in the Aleutian Islands census division, but these impacts will be much less than those expected from expansion of the U.S. bottomfish industry. In addition to the impacts on adjacent land areas, North Aleutian Shelf OCS development will generate employment and population impacts in distant parts of Alaska, because most petroleum workers in the area will live in isolated dormitories during work periods, and will commute during frequent rest periods to permanent residences in other regions of Alaska or out of State. Most in-state commuters will live in Anchorage. Resident employment impacts in Anchorage and other distant parts of Alaska could total 500 jobs for the mean expected resource development level, or 600 jobs in the unlikely event of total development of all area resources. Population impacts would be approximately twice as great as the increases in resident employment.

The impact of the proposal on the resident employment and population would be high in the sense that potentially significant short-term stress would be imposed on public and private services and facilities in the adjacent land area (particularly the Aleutian Islands census division). This would be true either at the mean expected resource development level or in the unlikely event of total development of all area resources.

g) Native Subsistence Cultures: The North Aleutian Basin planning extends easterly from Unimak Pass to encompass Unimak Island, the Alaska Peninsula and Bristol Bay. The northern reaches of the planning area lie offshore of the Kuskokwim Bay and delta of the Kuskokwim River. Within the confines of this potential impact area are situated some 62 villages, composed of 24 villages from the Bristol Bay-Alaska Peninsula area and 38 villages from the Kuskokwim River, nearby Bering Sea coast and Nunivak Island. Based on Census Area statistics, the population of this area totaled 16,709 in 1980, of which 78 percent (13,127) were Alaskan Natives. Outside the regional centers of the area, the Dillingham Census Area (excluding the City of Dillingham) was 86 percent Alaskan Native, and the Bethel Census Area (excluding the City of Bethel) was 92 percent Alaskan Native.

The cultures represented are solely Yupik Eskimo in the Kuskokwim Bay and River area (part of the Yukon-Kuskokwim delta region of the Association of Village Council Presidents, representing some 57 Yupik speaking villages in all) and a mixture of Yupik Eskimo, Aleut and Athabaskin Indian cultures elsewhere. Within Bristol Bay, Yupik Eskimo people generally inhabit the northern part of the Bay and the interior river systems, while Aleut people generally populate the Alaska Peninsula easterly to Naknek. The central part of the Bay contains a mixture of Yupik Eskimo and Aleut people, while the inland Iliamna Lake area is inhabited by a mixture of Yupik Eskimo, Aleut and Athabaskin Indian people.

Although distinct cultural differences abound within this potential impact area, the principle similarity among people is the occupational identification of fishermen. Here too there are differences in meaning among groups, varying from the operator of the wide-body 32 foot (the maximum length of fishing vessels in Bristol Bay) fiberglass vessel from Port Heiden to the skipper of a 16 foot wooden skiff from Kokhonak on Lake Iliamna or Kwethluk on the Kuskokwim River. Most all native Alaskan people in the area defined, are involved in summer commercial salmon fishing in some way or another. For many, this is the primary or sole source of cash income for the year. Except perhaps for those living in the larger settlements (Dillingham, Bethel, Naknek) who are accustomed to working other jobs as well during the year, such income in many respects is viewed in the villages as a means of subsidizing their subsistence way of living during the rest of year. This subsistence orientation is repeatedly demonstrated year after year in the subsistence salmon harvest in the area. Of the almost one million salmon taken for subsistence in Western Alaska in 1980, 213,200 (22 percent) were attributed to Bristol Bay, 224,900 (23 percent to the Kuskokwim River, and 445,000 (45 percent) to the Yukon River. In some parts of the area, the subsistence harvest exceeds the commercial harvest, such as occurred with king salmon in 1976 and 1980 on the Kuskokwim River, or only subsistence fishing is carried out, e.g. herring fishery on Nelson Island.

Although fishing is emphasized here, subsistence living in the villages represents the use of a wide variety of other fish, marine mammals, migratory

birds and waterfowl, and land mammals (such as caribou, moose and fur beavers) when available throughout the year. The emphasis on resource utilization, implying economic dependency on renewable resources, is an undeniable fact in the area; but the meaning of subsistence practices and activities culturally are such to perpetuate and celebrate the village as a socially value-laden phenomenon among families, generational groups, and a wider group of people of similar value orientation.

Disruption in the access to or availability of locally used subsistence resources from the effects of localized oilspill events could have major impacts on village sociocultural systems. The statistically derived mean number of spills equal or greater than 1,000 barrels is 1.2 for the planning area. The comparable figure for spills equal to or greater than 10,000 barrels is 0.1. Spills reaching habitats critical to specific marine resources used locally or within the immediate vicinity of the villages, where beaches, lagoons, or tundra are intensively used for subsistence resource harvest, could increase the possibility of direct and indirect impacts on local sociocultural systems. Spills effecting the commercial salmon harvest could affect the total livelihood pattern of the villages in the potential impact area, especially since the fish species involved are used for both subsistence and commercial purposes.

Native Alaska cultures in this area historically have not experienced the effects of change at a uniform rate and scale. In the last several decades, however, the area as a whole has experienced rapid social change, the effects of modernization in living, health, transportation, education, communication, fuel and the like. Adaptations of subsistence lifeways to such changes have varied, but the net result generally has been village people living at risk of relatively small variations in valued social and economic systems (both in subsistence and western economic systems) causing large consequences and resulting potentially in major impacts to value systems and cultural orientations, whether real or perceived.

Conclusions. Impacts on native subsistence cultures over the life of the field are expected to be moderate to high due to the relative vulnerability of village socioeconomic and sociocultural systems to real or perceived localized effects of offshore operations.

Cumulative Impacts. In the unlikely event that all areas of the North Aleutian Basin planning area are leased and all resources subsequently are developed over the life of the proposal, the expected number of oilspills is 2.1 spills greater than 1,000 barrels and 0.9 spill greater than 10,000 barrels. An additional unknown quantity of oilspills is expected to result from tankering from Federal OCS lease sales in the Barrow Arch, Hope Basin, Norton, Navarin and St. George planning areas as well as from development of State of Alaska territorial waters in Norton Sound and Hope Basin. Additional projects or activities that could contribute to cumulative impacts in the planning area are tankering through Unimak Pass, State and private onshore and nearshore leasing, more diversified fisheries development, hydro projects, and the Bristol Bay Cooperative Management Plan. These total projects or activities would effect Native subsistence cultures. Oilspill damage or other disturbances to local subsistence resources would divert, displace or reduce the availability of subsistence resources. Major disruption in the access to or availability of local subsistence resources where they were traditionally found would disrupt

traditional subsistence effort patterns. Such disruptions would a) reduce subsistence catch of the resources customarily used, b) prevent the pursuit of subsistence practices by segments of the population due to the costs of using an increased subsistence range, c) disrupt traditional (cultural and spiritual) patterns of obligation, d) impairs fulfillment for kinship-based assistance networks and care of the elderly and, e) induce chronic stress and anxiety over imbalances in nature, i.e. the fear of further changes in such relationships, and the inability to do anything about it. Impacts from such effects would include increased disease, malnutrition and mental disorders, family breakup and conflict, substance abuse and generational conflict. Localized impacts would be magnified within the region through the breakdown of customary inter-village (through family networks) resource distribution patterns and obligations.

The cumulative impacts of these oilspill events, projects and activities are expected to produce a moderate to high impact to Native subsistence cultures in the North Aleutian Basin planning area.

In the unlikely event that all resources in the planning area leased and developed," the alternative contributes 57 percent of spills greater than 1,000 barrels and 11 percent of spills greater than 10,000 barrels. These proportions are reduced significantly when the tankering from other Federal OCS planning areas and State lease sale areas (to an unknown extent) are considered. Here the alternative contributes moderately to the total cumulative case. Consequently, the most important causal agent for potential cumulative impacts on native subsistence cultures is the tankering of offshore crude oil production near the planning area. The contribution of the alternative to cumulative impacts is marginal in either the case of only the resources described or all resources leased and developed in the planning area.

3) Impacts on Other Management Plans

Coastal Zone Management: As discussed for the Shumagin area, there are no plans for CRSA formation to Lower Bristol Bay east to 160° W. longitude. A Bristol Bay CRSA has been organized, but will not have a plan developed until mid-1984.

The City of Bethel and the Yukon-Kuskokwim CRSA are well along in their plan development, with approval expected in mid-1983 and early 1984, respectively. The Bristol Bay Borough will also have a plan that should be approved by mid-1983.

A major factor in determining land use and facilities sites will be the Bristol Bay Cooperative Management Plan, which is to be completed by the end of 1983. This plan and the CZM plans should be in place close enough after the sale date to guide oil and gas development activities.

Fishery Management Plans: In addition to the statewide plans mentioned above, a plan has been written for all ground fish in the Bering Sea and Northern Aleutian Shelf region.

Bristol Bay at one time was nominated as a marine sanctuary.

4) Unavoidable Adverse Impacts: Oilspills, discharges of drilling effluents (muds, cuttings, and formation waters) and sewage disposal would result in unavoidable adverse impacts to water quality under the proposal. Impacts from all of the above except oilspills could be mitigated by EPA, NPDES regulations.

Water supply would be unavoidably adversely affected by this proposal. Limited supplies would be consumed by OCS-related infrastructure and development, creating demands on supplies of an unknown quantity.

The unavoidable adverse impact for land use would be a reduction in the amount of land available for other uses. Occupation of land by OCS-related activities and structures would be minimal.

Coastal ecosystems would be unavoidable adversely affected by oilspills and various discharges as mentioned above for water quality. The level of impact would be restricted both geographically and temporally.

The proposal would have unavoidable adverse impacts on fish by oilspills contacting nearshore habitats or eggs and larvae which occur on or near the surface. Oilspills would also affect commercial fishermen by reducing the number of harvestable fish. These impacts are expected to be minimal.

Birds, marine mammals and endangered species would also suffer unavoidable adverse impacts from oilspills. The level of impact would depend on when and where the oilspill occured. Regional endangered species consultation with NMFS and FWS is required and would be conducted as needed.

Recreation and tourism resources could be adversely affected unavoidably by damage to visual resources through the intrusion of onshore support infrastructure and road systems, nearshore systems or causeways, pipelines and drilling islands offshore oiland gas platforms, and vessel and aircraft traffic supporting such operations. Such effects would be localized and may serve as an attraction to a segment of the recreation and tourism population.

Cultural resources offshore, such as housepits, burins, scrapers, arrowheads and other artifacts, could be unavoidably destroyed through OCS operations; however, the complex dynamics of the marine environment may already have resulted in the destruction of many of these resources. Cultural resources located onshore could be lost or damaged by public pilfering or indiscriminate exposure of artifact sites.

Introduction of urban and industrial land uses, except for regional urban centers, would change the character of isolated, de facto wilderness areas, but impacts would be isolated and small in relation to the total area involved. Where urban centers are involved, land use demands generated by OCS activities could unavoidably produce adverse effects derived form the rate and relative scale of demand. Land speculation and price inflation would be expected as well as interruptions incommunity facilities and infrastructure during the period necessary for such aspects of land development to catch up with increased land use demands.

Native subsistence cultures would be adversely affected directly in an unavoidable way through accidental oilspills and an increase in population,

both of which are casual agents which would affect the access to and availabilty of subsistence resources. Such impacts have been discussed previously. Localized effects in villages could have adverse affects throughout the village region. Disruption of customary urban-village migration patterns, through effects such as urban housing shortages, price inflation or reduced supply of public services, could cause hardship for those segments of the population unable or unwilling to adapt to such changes and contribute to social disorder and disorientation of cultural value systems.

5) Relationship Between Local Short-Term Uses and Maintenance and Enhancement of Long-Term Productivity: The effect of the alternative would vary in kind, intensity, and duration, beginning with preparatory activities (seismic data collection and exploration drilling) of oil and gas development, and ending when natural environmental balances might be restored.

Biological productivity would be lost in the short-term on all onshore lands used in the proposed project. These areas could be returned to productivity in the long-term with proper management. Restoration may not be entirely feasible, however, the overall loss would be a minor adverse affect. Direct land requirements would be expected in both the short-term and the long-ter because of disturbance. Major construction projects would cause definite changes in both the short-term and long-term. Some species may have difficulty repopulating and could be displaced.

Short-term oil pollution and the possibility of long-term cumulative oil pollution impacts would cause serious adverse effects on all components of the marine ecosystem, including fisheries. While restoration would allow fisheries production to regain original levels, any reduced annual harvests during the life of the project would be irretrievably lost. The extent is not known presently, but the potential must be recognized.

Freshwater pollution from onshore activities is a short-term effect. The long-term decrease in water quality may be considered to be a tradeoff for obtaining oil and gas resources.

The biota would be threatened in the short-term by potential oil pollution. Direct mortality would be significant through the combined effects of harassment by humans and the increased volume and frequency of noise from vessel traffic or overflying aircraft. In the long-term, such disturbances would alter behavior patterns and would drive fauna away from traditional feeding and breeding grounds or to other critical areas within their range, reducing species populations over a long period of time.

Habitat destruction would cause a reduction in subsistence species which would threaten the regional economy. The improved accessibility to primitive areas from increased construction is a short-term result of this alternative. The overall wilderness value of the coast may decrease from increased land use. Increased human populations in the short-term would change the regional Native culture in the long-term. The subsistence way of life would be modified and population shifts would occur. The overall changes cannot be termed positive or negative, except by those affected.

Archaeological and historic values discovered during development would enhance long-term knowledge. Overall, finds may help to locate other sites, but destruction of artifacts would represent long-term losses.

Consumption of offshore oil and gas would be a long-term use of non-renewable reosurces. Economic, political, and social benefits may accrue from the availability of oil and gas. Most benefits would be short-term and would decrease the nation's dependency on oil imports.

The production of oil and gas from the planning area would provide short-term, critically needed energy, and perhaps, provide time either for the development of long-term alternative in these areas may mean the irreplaceable loss of some fisheries production. The maintenance and ehancement of long-term productivity would depend on efforts to control water quality levels. Regional planning would aid in controlling changing economics and populations, and thus, in moderating any adverse impacts.

6) Irreversible and Irretrievable Commitment of Resources

a) Minerals Resources: Resources discovered would be irretrievably consumed.

b) Biological Resources: Commercial fishery losses may occur principally by oilspills interfering with salmonid migrations or by their direct contact with larval fishes and/or their planktonic food supplies. Any losses of commercial fishing incomes attributable to this alternative would be irreversible and irretrievable. Unharvested commercial finfish and shellfish, as renewable resources, would be irretrievably lost to the economy. Increased air and ship traffic and onshore activities, as well as potential habitat degradation or reduction in available food resulting from oil and gas industry operations could displace birds and mammals into less favorable environments, ultimately resulting in reduced population levels. Displacement could become irretrievable if permanent alterations of the environment were maintained by such activities.

c) Endangered Species: Under the alternative, it is possible that endangered whales would be subjected to irreversible direct and indirect affects of oilspills, disturbance due to noise and other human activities, or losses and/or deterioration of habitat due to facility developments. Whether effects would lead to permanent (irreversible) losses of whale resources is unknown.

d) Social Systems: Village subsistence practices could be affected irreversibly by the displacement of subsistence resources from locally used customary habitats or by the reduction of resources through the modification of favorable habitats. The displacement could be irretrievable if the effect were maintained over time. Irreversible changes in cultural values and orientations could occur from the proposal, but the irretrievable nature of these changes to the sociocultural system is unknown.

A high growth situation could cause increased housing costs and shortages and could place extreme demands in utility services such as electrical power, water, sewage, and solid waste disposal. Attempts to provide basic service

levels for the above items to meet increased population levels could force communities to forego improvements to the existing services.

Due to the increase in air and marine traffic generated by this alternative and, more importantly, the severely inclement weather to which the area is prone, it is highly probable that there would be an increase in transportation related fatalities over the life of the proposal.

e) Economic Systems: The only commitment that could possibly be considered irreversible and irretrievable would be the economic risk of destruction of commercial fisheries resources or destruction of other fauna or flora used for subsistence by area residents, as a result of OCS activities.

f) Cultural Resources: The destruction of an underwater OCS cultural site would possibly result in an irreversible and irretrievalbe loss of information about prehistoric human occupancy.

b. Alternative I-2

Resource estimates and attendant activities, and oilspill probabilities are the same in the North Aleutian Basin for this alternative as for Alternative I-1. This being the case, impacts resulting from this alternative would be the same a those described for Alternative I-1. In addition, impacts on other management plans and unavoidable adverse impacts would be the same. The relationship between short-term use of man's environemnt and long-term productivity for this alternative is the same as described for Alternative I-1. The irreversible and irretrievable commitment of resources associated with this alternative is also the same as described for Alternative I-1.

c. Alternative II

Resource estimates and attendant activities, and oilspill probabilities are the same for this alternative as for Alternative I-1. This being the case, impacts resulting from this alternative would be the same those described for Alternative I-1. In addition, impacts on other management plans and unavoidable adverse impacts would be the same. The relationship between short-term use of man's environment and long-term productivity for this alternative is the same as described for Alternative I-1. The irreversible and irretrievable commitment of resources associated with this alternative is also the same as described for Alternative I-1.

For the cumulative case for this alternative, the number of oill spills associated with tankering of oil through the North Aleutian Basin planning area from other OCS planning areas would not be significantly different from Alternative I-1. In addition, all other projects and proposals assumed for Alternative I-1 are also assumed for this alternative. Thus, cumulative impacts for this alternative would be the same as described for Alternative I-1.

d. Alternative III-1

The area proposed for lease under this alternative does not include the area within 50 miles of Unimak Pass or within 6 miles of the northern Alaska

THE MORE SIGNIFICANT ENVIRONMENTAL CONSEQUENCES

North Aleutian Resource Category	Level of Expected Impacts* Scheduled Sales Only Under Alternative I-1	Cumulative Impacts of All Activities
1. General Impacts		
a. Coastal Ecosystems	low to moderate	high
b. Water Quality and Supply		
Water Quality	very low	moderate
Water Supply	high	very high
c. Navigation and Shipping	very low	very low to low
d. Other Uses of the OCS	n/a	n/a
e. Land Use	low	moderate
f. Cultural Resources	low to moderate	moderate
2. Impacts of Special Concern		
a. Fish and Commercial Fisheries		
Fish Resources	low	moderate
Commercial Fisheries	low	moderate
b. Endangered Species	moderate	moderate to high
c. Habitats and Resources of Special Concern	moderate	moderate to high
d. Air Quality	low	low
e. Recreation and Tourism	low to moderate	moderate
f. Socioeconomic Factors	low	very high
g. Native Subsistence Cultures	moderate to high	moderate to high

* Definitions of level of impact are provided at the beginning of Section V.D.

(This table also applies to Alternatives I-2, II, III-1, III-2, and IV-2. See text.)

Peninsula coast. Thus, the potential for adverse impacts due to noise or oilspills on coastal ecosystems and endangered species, particularly the grey whale, would be reduced from moderate to low with this alternative. Impacts on habitats and resources of special concern (birds and marine mammals) would also be reduced from moderate to low.

Eliminating Bristol Bay sales under this alternative would eliminate potential conflicts between OCS-related activities that would otherwise have occurred in the Bristol Bay area and the land use plans to be developed as part of the Bristol Bay Cooperative Management Plan or future coastal zone management plans for the coastal areas adjacent to the Bristol Bay area. Thus, impacts on land management plans for the Bristol Bay area would be reduced. The amount of reduction cannot be estimated.

Except for those described above, impacts, including cumulative impacts, on resources and activities of the North Aleutian Basin would not be significantly different from those described for Alternative I-1. The relationship between short-term use of man's environment and long-term productivity for this alternative is the same as that described for Alternative I-1. The irreversible and irretrievable commitment of resources associated with this alternative is also the same as described for Alternative I-1.

e. Alternative III-2

Resource estimates and attendant activities, and oilspill probabilities are the same for the North Aleutian Basin under this alternative as for Alternative I-1. This being the case, impacts resulting from this alternative would be the same as those described for Alternative III-1. That is, impacts on coastal ecosystems and endangered species would be reduced from moderate to low as would impacts on habitats and resources of special concern (birds and marine mammals). Impact on management plans, as for Alternative III-1, may be reduced by an unknown amount. Impacts including cumulative impacts, on other resources and activities in the North Aleutian Basin area would be the same as described for Alternative I-1 (and Alternative III-1). Likewise, unavoidable adverse impacts would be the same as described for Alternative I-1. The relationship between short-term use of man's environemnt and long-term productivity for this alternative is the same as described for Alternative I-1 as is the irreversible and irretrievable commitment of resources associated with this alternative.

f. Alternative IV-1.a.

All sales from the planning area have been deleted from the schedule, thus no impacts are expected. For the cumulative case, all other projects and proposals assumed for Alternative I-1 are assumed for this alternative. Given that the proposal is only a minor contributor, cumulative impacts are not significantly different from those described in Alternative I-1.

g. Alternative IV-1.b.

Resource estimates and attendant activities, and oilspill propabilities for the North Aleutian Basin for this alternative are the same as for Alternative IV.1.a. See the impact analysis for that alternative (Sec. V.D.14.f).

North Aleutian

Resource Category	Level of Expected Impacts* Scheduled Sales Only Under Alternative IV-1	Cumulative Impacts of All Activities
1. General Impacts		
a. Coastal Ecosystems	n/a**	high
b. Water Quality and Supply		
Water Quality	n/a**	moderate
Water Supply	n/a**	very high
c. Navigation and Shipping	n/a**	very low to low
d. Other Uses of the OCS	n/a	n/a
e. Land Use	n/a**	moderate
f. Cultural Resources	n/a**	moderate
2. Impacts of Special Concern		
a. Fish and Commercial Fisheries		
Fish Resources	n/a**	moderate
Commercial Fisheries	n/a**	moderate
b. Endangered Species	n/a**	moderate to high
c. Habitats and Resources of Special Concern	n/a**	moderate to high
d. Air Quality	n/a**	low
e. Recreation and Tourism	n/a**	moderate
f. Socioeconomic Factors	n/a**	very high
g. Native Subsistence Cultures	n/a**	moderate to high

* Definitions of level of impact are provided at the beginning of Section V.D.

** Differs from the proposal.

h. Alternative IV-2.a

Resource estimates and attendant activities, and oilspill probabilities in the North Aleutian Basin area are the same for this alternative as for Alternative I-1. This being the case, impacts resulting from this alternative would be the same as those described for Alternative I-1. For the cumulative case, for this alternative, the number of oilspills with tankering of oil through the North Aleutian Basin from other OCS planning areas would not be significantly different from Alternative I-1. Dropping the Arctic sales under this alternative would mot make a significant difference in the cumulative analysis for this planning area. All other projects and proposals assumed for the cumulative case for Alternative I-1 are also assumed for this alternative. Thus, cumulative impacts for this alternative would be the same as described for Alternative I-1. Impacts on other management plans and unavoidable adverse impacts would be the same as described for Alternative I-1. The relationship between short-term use of man's environment and long-term productivity for this alternative is the same as that described for Alternative I-1 as is the irreversible and irretrievable commitment of resources associated with this alternative.

i. Alternative IV-2.b

Resource estimates and attendant activities, and oilspill probabilities are the same for this alternative as for Alternative I-1. This being the case, impacts resulting from this alternative would be the same a those described for Alternative I-1. For the cumulative case for this alternative, the number of oilspills asscoiated with tankering of oil through the North Aleutian Basin from other OCS planning areas would would be significantly different from Alternative I-1. Dropping the Arctic sales under this alternative would not make a significant difference in the cumulative analysis for the planning area. All other projects and proposals assumed for the cummulative case for Alternative I-1 are also assumed for this alternative. Thus, cumulative impacts for this alternative would be the same as those described. Impacts on other management plans and unavoidable adverse impacts would be the same as described for Alternative I-1. The relationship between short-term use of man's environemnt and long-term productivity for this alternative is the same as described for Alternative I-1 as is the irreversible and irretrievable commitment of resources associated with this alternative.

14. St. George Basin

a. Alternative I-1

1) General Impacts

a.) Coastal Ecosystems: OCS development in the St. George Basin planning area could have serious adverse impacts on highly important marine mammal and marine bird populations, and general marine wildlife habitats. The Aleutian Islands have been designated as a National Wildlife Refuge because of the abundance and diversity of wildlife found there. The Pribilof Islands have the most important northern fur seal concentration in Alaska, and could be adversely impacted from oilspills in the planning area. The Pribilof Islands and the Bogoslof NWR also have enormous seabird colonies, numbering in the millions, that could be severely impacted by oil pollution, air traffic, construction, and other oil and gas activities. The Aleutian Islands, adjacent to the planning area and within the North Aleutian Shelf planning area, represent the most productive sea otter habitat in the world. Sea otters could be severely impacted by oil pollution from the planning area. Unimak Pass, located between the St. George and North Aleutian Shelf proposed sale areas, is an important marine mammal migration route. Seals, sea lions, and cetaceans could be adversely impacted by oilspills or oil and gas activities in the pass.

Waters around the Pribilof Islands and intertidal areas near the Alaska Peninsula are important fisheries habitats in this proposed sale area. Expecially important are the king crab spawning and larval release areas from Unimak Island to Port Moller and around the Pribilof Islands. Oilspills could kill adult crabs on their spawning beds and the near-surface dwelling larval crabs; both adults and larvae inhabit the areas described above during summer.

Refer to the section that describes impacts from this alternative on habitats and resources of special concern (Sec. V.D.14.a.2)c) for a related discussion.

Conclusion. Coastal ecosystems in St. George are expected to be moderately impacted by oilspills and OCS related noise. Especially important, potentially affected areas are the following: Pribilof Islands, important for seal and seabird habitat (oilspills and noise); the intertidal waters near the Pribilof Islands and the Alaska Peninsula (Unimak Pass to Port Moller), important crab and finfish habitat (oilspills); Unimak Pass, important for marine mammal migration and sea otters (oilspills and noise); and the eastern Aleutian Islands, important habitat for whiskered auklet (oilspills and noise).

Cumulative Impacts. In the unlikely event that all areas of the St. George planning area are leased and all resources subsequently are developed over the life of the proposal, the expected number of oilspills is 3.2 spills greater than 1,000 barrels and 1.4 spills greater than 10,000 barrels. An additional unknown quantity of oilspills is expected to result from tankering from Federal OCS lease sales in the Norton, Navarin, Hope and Barrow Arch planning areas through the planning area, as well as from tankering of oil from State of Alaska territorial waters. An additional project that could contribute to cumulative impacts in the planning area would be tankering of oil from proposed Native Corporation leases (Calista) in the Yukon Delta.

These projects or activities could affect important shellfish, bird, and marine mammal habitats around the Pribilof Islands, marine mammal migration routes in Unimak Pass, and the seabird colonies of the Bogoslof NWR by substantially increasing the risk from oilspills. The cumulative effects of these expected oilspill events, projects and activities are expected to produce a moderate to high impact to important coastal ecosystems in the St. George planning area.

In relation to the unlikely case of all resources in the planning area are leased and developed, the alternative contributes about 56 percent of spills greater than 1,000 barrels and about 57 percent of spills greater than 10,000 barrels. These proportions are reduced significantly when the tankering from other Federal OCS planning areas and State lease sale areas (to an unknown extent) are considered. The alternative contributes a minor portion to the total cumulative case. Consequently, the most important causal agent for potential cumulative impacts on coastal ecosystems is tankering of oil produced in other lease areas, through this planning area. The contribution of the proposal to cumulative impacts is small in either the case of the alternative or all resources being leased.

b.) Water Quality and Supply:

(1) Water Quality: Expected onshore water quality impacts are similar to those discussed for the Gulf of Alaska under the proposal.

Offshore water quality in the St. George Basin is pristine. If expected commercial quantities of gas and oil occur and are developed 490 million barrels of formation waters would be produced. The predicted number oilspills 1,000 barrels or greater is 1.8 and of 10,000 barrels or greater oilspills is 0.8. During the years of exploratory and developmental drilling, 19,400 yd^3 of drill cuttings and 58,200 barrels drilling mud would be discharged offshore. These discharges would cause short-term decreases in water clarity over 0.02 percent of the basin. If formation waters are discharged, they would contribute the equivalent of 97,000 barrels of oil into basin waters as dissolved hydrocarbons. In the absence of a major oilspill, offshore petroleum development would result in slight chronic oiling of basin waters and reductions in water clarity near permanent structures. A major spill would contaminate waters adjacent to the spill, but the effect on water quality would only be short term.

(2) Water Supply: Service/support facilities and housing facilities for OCS development are assumed to be enclaved on the south side of the Alaska Peninsula outside the planning area (see Shumagin). The planning area is not expected to be required to provide water for oil and gas development (support or housing).

Conclusion. The effects of oil and gas development in this planning area on water quality would be low, except possibly in the immediate vicinity of a platform. Water supplies are few in number along the adjacent land area, and new sources would have to be developed in the Shumagin planning area. Water supply development impacts will be very low in the St. George Area.

Cumulative Impacts. Water Quality: In the unlikely event that all potential oil and gas resources of the St. George Basin planning area are leased and subsequently developed over the life of the Proposal, the expected number

oilspills is 3.2 spills of 1,000 barrels or more with 1.4 spills of at least 10,000 barrels. An additional unknown quantity of oilspills is expected to result from tankering from Federal OCS lease sales in Navarin Basin, Norton Basin, Hope Basin and Barrow Arch planning areas, as well as from development of State of Alaska onshore and offshore reserves in Bristol Bay uplands, Norton Basin, and Hope Basin areas, and from development of Native Corporation onshore reserves near the Barrow Arch area and the Canadian Beaufort. Oil industry development of all gas and oil reserves in the St. George Basin planning area would result in discharge of 36,400 cubic yards[3/] of drill cuttings and 109,200 barrels of drilling mud during drilling phases. Formation waters produced would total 710 million barrels over the life of the field. Additional projects or activities that could contribute to cumulative impacts in the planning area are expansion of commercial fisheries and commercial traffic. These projects and activities could affect water quality mostly by discharge of fish wastes and increased risk of fuel spills. The cumulative impacts of these oilspill events, discharges, and additional traffic are expected to produce a moderate impact to water quality in the planning area.

In the unlikely case of all resources in the planning area are leased and developed, the St. George Basin planning area in this alternative contributes 56 percent of spills of 1,000 barrels or more and 57 percent of spills of at least 10,000 barrels. The St. George Basin planning area in this alternative would provide 55 percent of cumulative impact to the planning area from drill cuttings, 54 percent of the impact from drilling mud, and 54 percent of the impact from formation waters. The greatest threat to St. George Basin water quality is from oil pollution. The contribution of the proposal to overall cumulative impacts on water quality is minor whether compared to the overall cumulative impacts with total development of all hydrocarbon resources in the planning area or without total development.

Water Supply: If all potential oil and gas resources of the St. George Basin planning area were leased and developed, new water supply facilities would be required in the Shumagin area, causing very high impact if drawing on existing facilities. Other cumulative impacts are expected from expansion of the domestic commercial fisheries, growth of general commercial activities, and Federal OCS development of the Navarin Basin. The sum effect of these additional impacts is likely to be high in the St. George region. The fishing industry in Unalaska is already taxing existing water supplies in that area.

If OCS development support and services as well as population are on the most part enclaved, new water facilities will have to be builtat the enclave site (Shumagin area). However, these are not expected to affect existing populations or facilities and, therefore, are not considered an important contribution to water supply cumulative impacts.

3) Navigation: As a result of three potential sales in the St. George Basin region, three platforms are expected to be sited for development of the resources. Given the extent of the planning area and level of fishing boat usage with the subject area, significant impacts to navigation are unlikely to occur. Product transportation should not cause a significant impact to navigation. Some traffic congestion could occur in and around the port of Dutch Harbor/Unalaska. The utilization of this port site as a support and supply base for St. George (as well as North Aleutian Basin)

activities may cause short-term space use conflicts with the extensive fishing fleet which operates from Dutch Harbor.

Conclusion. Except in Dutch Harbor where the impacts could be moderate to high, the probability is low that impacts on navigation would occur. Overall, the level of expected impacts is low.

Cumulative Impacts. Vessel traffic within the southern Bering Sea is expected to result from the following sources: Crude oil tankering and related support traffic from OCS development in the Hope, Norton, Barrow Arch, and Navarin planning areas; commercial traffic; foreign fishing activities; and the U.S. commercial fishing fleet. Vessel traffic within the southern Bering Sea is expected to rapidly increase during the next decade. The increase in traffic will tend to mute the impacts that the three St. George sales may have. In either the cumulative or the mean resource case, St. George development related traffic will compose no more than one-to-two percent of all traffic within the southern Bering. The navigational impacts in the St. George area are low.

A potential for significant cumulative impacts exists for the Unimak Pass. Given its high use by the fishing industry, the potential for intermittent space use and vessel conflicts exists during and beyond the limits of this proposed five year plan. The Pass lies astride the great circle route and functions as the principle conduit to vessel traffic entering the Bering Sea and/or traveling to the Orient. The addition of crude oil tankerage, supply barges, and other vessels which may enter the area as a result of this proposal may well precipitate a situation in which a well defined vessel separation scheme would have to be established for the Pass. At the maximum OCS-related traffic, generated by activities within the Bering, could compose ten-to-fifteen percent of all traffic entering the Pass. This is not considered a significant portion.

d) Other Uses of the OCS: This area is mainly used by commercial fishermen. There is also a concentration of vessel movements at Unimak Pass. At certain times of the year there might be some space use conflicts. Space-use conflicts are discussed in Navigation, above, and Commercial Fisheries, below.

e) Land Use: Unalaska/Dutch Harbor and Adak are the only large-scale infrastructure in the planning area. However, an enclave development for an oil terminal, LNG plant and support/supply facilities, or an oil pipeline to a transhipment point on the south side of the Alaska Peninsula was assumed for development of the resources. This should minimize conflicts with established areas (even if the enclave is located nearby to them), both in terms of land use and in competition for goods and services. There could be some localized land use impact, as the enclave would likely be sited at an undeveloped location and involve approximately 200 acres.

Conclusion. Impacts would be low because OCS-related facilities would likely be sited on the south side of the Alaska Peninsula, an undeveloped area where no land use plan exists.

Cumulative Impacts. Other projects that will affect land use in the St. George Basin area are the developing bottomfishing industry, and the Chernofski Point

planned fishing community. These should affect land use in the following ways: the rapidly increasing bottomfishing industry would tend to increase population at the region's major urban center of Unalaska, while the establishment of a community at Chernofski Point would bring into being a planned community in the midst of an unpopulated wilderness. It is expected that additional land use impacts because of oil and gas development would affect 200 acres of land because of the need for a regional material support base, an oil and gas support facility, docks, warehouses, and living quarters. OCS development would probably result in major changes in land use but not create significant conflicts as an enclave would be located in an undeveloped area. The location of any facilities in or near the town of Unalaska would tend to disrupt land use patterns by depriving the fishing and building industry of land necessary for industrial and private development. The Unalaska area lacks easily developable lands.

Land use impacts from total development of hydrocarbon resources in the planning area would affect 300-350 acres of land because of the need for a large oil and gas processing facility, as well as dock facilities, a large regional material support base, warehouses, living quarters, and if necessary, airport facilities. The maximum resource development would result in moderate to high changes in land use. If any of these facilities are located near the town of Unalaska, land required by the area's rapidly developing fishing industry could be denied to them causing the possible relocation of many of the area's canneries.

The contribution of the proposal to cumulative land use impacts is major but probably not significant as new facilities will be sited in remote areas where competition for space is not an issue. Major changes are occuring as a result of the expansion of the fishing industry.

f) Cultural Resources: There would probably be degradation of some onshore sites containing cultural artifacts. (See OCS Sale 70 DEIS for details on impacts and resources). The probability of contact of oil and gas activity with submerged sites is unlikely due to the few projected platforms and few offshore cultural sites in areas of high resource potential. The probability of significant impact would be likely, however, if contact takes place. The probability of significant impact due to increased contact of the population with onshore cultural resources is likely if valuable cultural resources are present in the location of the expected enclave.

Conclusion. Impacts on offshore cultural resources would be low becuase contact with submerged sites would be unlikely. Impacts on onshore sites could be low to moderate, as damage, or destruction of some of the numerous known and suspected sites adjacent to the area would likely occur.

Cumulative Impacts. The proposed projects mentioned in the OCS Lease Sale 70 DEIS would cause additional impacts on cultural resources. Airport expansion at Unalaska would mean an increase in tourism and other businesses which, added to the OCS impact, would increase visitation to cultural resources in the area, particularly the Russian Orthodox Church at Unalaska. Expansion of the bottom fishing industry and the development of a new fishing settlement will result in some disruption to cultural resources.

If Federal proposals for sales in the Norton Sound, North Aleutian Basin, and Navarin Basin planning areas go forward, increased tanker, work boat, and aircraft traffic may result in the planning area, increasing the risk of damage and population impacts on cultural resources. Significant contact with oil-related activities within Unimak Pass and at support locations and development facilities would likely occur. The possible occurence of the State Sale No. 41, Southwest Bristol Bay Uplands, by 1984 would increase the use of land area near the mouth of the Kuskokwim and other rivers which may include cultural resources in the USGS quandrangles of Baird Inlet, Goodnews, and Hagmeister Island. Overall, the level of impact to cultural resources in the planning area is low to moderate. OCS leasing and development in the planning area is not a significant contributor.

2) Resources of Special Concern

a.) Commercial and Subsistence Fisheries

(1) Important Fish Resources: The important commercial fishery resources of the St. George planning area include all five species of Pacific salmon, king and Tanner crab, halibut and several species or groups of bottomfish (ocean perch, blackcod, walleye pollock, Pacific cod, yellow fin sole, and flounder). Subsistence fisheries tend to rely more heavily on salmon, and to a lesser degree on crab and other shellfish. Impacts to these resources would result from accidental oilspills and discharge of drilling effluents and wastes.

Over the life of the proposal, about 1.8 oilspills greater than 1,000 barrels and about 0.8 oilspills greater than 10,000 barrels are expected to result from Alternative I-1. Oilspills can impact fish populations by causing short-term acute impacts or long-term sublethal impacts. Since most oil remains at or near the surface, species that are most vulnerable are those that inhabit the surface layer or shallow nearshore at least some time during their life cycle. These species include salmon (adult and juvenile of all five species, and egg and larvae of pink and chum salmon), herring (all life stages), crab (larvae of all species), and several species of demersal fish (eggs and larvae).

Salmon: Adult salmon of all five species would be vulnerable to oil contamination if a spill contacted areas in or near the mouths of rivers during or preceding periods when these fish are congregating near these river mouths prior to migrating up river to spawn. Smolt would be susceptible to adverse impacts in the same areas during out-migration or in nearshore areas during their first few months in the marine environment. Pink and chum salmon would be vulnerable during all life stages as these species spawn intertidally to some degree. Vulnerability of any of the five species would vary depending on the timing of the spawning or out-migration of a particular population or run. All five adult species in this planning area exhibit a period of vulnerability (spawning period) of approximately three to four weeks. This period of vulnerability occurs between the months of May and September. Very little is known about the movements of juvenile salmon. They make coastwide movements (lateral to shore) feed and grow in the intertidal, and move offshore over a period of several months.

If it is assumed that if an oilspill contacts a nearshore area, especially off the mouth of a salmon stream, several impacts could occur. These impacts could be any of a variety of lethal or sublethal toxic responses, or the loss of fish prey organisms. Adult salmon are highly mobile, and some evidence suggests that this life stage could detect and avoid toxic levels of aromatic hydrocarbons in solution (Weber et. al., 1981). Therefore, the major concern seems to be that these adults would avoid areas of contamination, which if found off the mouths of major spawning rivers could result in delays in spawning runs or actual blockage of the river or stream. Given the fact that oilspills in the marine environment generally result in concentrations less than those which have proven toxic to adult salmon (Malins, 1977), it is quite unlikely that this type of impact would occur. Even if toxic concentrations did occur, these concentrations would not remain long in marine waters, especially off the mouth of major rivers where dilution would occur rapidly.

The eggs and larvae of pink and chum salmon that occur in marine intertidal areas would be the most vulnerable of these earlier life stages. It is difficult to quantify the impacts to a local salmon fishery from oilspill contamination in a spawning or larval rearing area. However, it is possible that a large portion of eggs and larvae could be lost. The gravity of this loss, however, becomes somewhat obscured when one considers that natural mortality of eggs and larvae may be as high as 75 percent for each of these life stages. The difficulty would be in ascertaining what percentage of those lost from oil pollution would have succumbed naturally. It is possible that most of a year class from a local population could be lost. When considering the large annual fluctuations in these species, however, this may not always be significant. Generally though a year class lost is not a desirable effect as it can significantly reduce later year population levels.

Given the extremely low number of expected spills (1.8 spills of 1,000 bbl or greater), and the narrow periods of vulnerability at least for adult and juvenile salmon, it is unlikely that an oilspill would contact important nearshore areas during the period when salmon are present. The level of impact to a local pink or chum population could be high as a result of oil contacting important spawning and larval rearing intertidal area. Areas of importance for pink salmon in this discussion include the Makushin Bay and Unalaska Bay in the eastern Aleutian area.

Shellfish: Two species or species group of crab (Tanner, and king) have similar life histories in that adults spend the winter months in deep water (150-400 m) and migrate to shallow (6-20 m) waters in the spring and summer to spawn. During this period, the eggs which have been carried by the female since the previous spawning period hatch and become free swimming planktonic larvae.

Distribution of these most sensitive larval forms is generally widespread and therefore, these forms would be the most susceptible to contact by an oilspill. The liklihood of such an interaction then is high at least once during the life of the field. Even in the case of a very large spill (10,000 barrels or greater) in the St. George region only an insignificant percentage of crab larvae would be contacted by concentrations of oil (1-10 ppm) that would cause mortality. The exception to this case would be if a large spill contacted the area around the Pribilof Islands where a rather discrete population of blue king crab resides. The outcome of such an event would be a moderate ecological

loss to the population. The level of impact on crab larvae is expected to be low for regional populations, however.

Another effect on crab populations may result from oil sinking to the bottom and contacting aggregations of adult or juvenile crab or by contaminating large areas and affecting their food supply. There is greater opportunity for this phenomenon in shallower, nearshore waters where adult and juvenile crab spend lengthy periods. The likelihood of such an event is somewhat less than contact to the larval stages, however, given the broad distribution of crab populations. Adult and juvenile crab are less vulnerable than larval stages. Therefore, the level of impact to these life stages on a regional basis is low. Local crab populations in nearshore waters could, however, suffer at least one short-term decline if their habitat is affected.

Demersal Fish: Demersal species including halibut would probably be less affected by an oilspill than any other species group. The most vulnerable species are those which have egg or larval forms that inhabit surface or nearshore surface waters. Important species in the St. George region which display this characteristic are halibut, ocean perch, yellow fin sole, flounder, and pollock. Because fish eggs and larvae are relatively sensitive to hydrocarbon contact, and because of the broad distribution of these life stages throughout the region, it is likely that the one oilspill would result in a low ecological loss to these species. The level of impact on a regional basis, would be low.

Several types of discharges and effluents could be released during OCS oil and gas activities. OCS Operating Orders prohibit disposal of any waste materials into the ocean that will create conditions which will adversely affect aquatic life. Disposal of waste materials is regulated by the Environmental Protection Agency. Of concern are drilling muds because very little is known about their long-term, chronic impacts. There are indications that these muds could produce elevated trace metal concentrations in marine organisms and interfere with reproductive processes. However, given that only 19 exploratory and 78 production wells are projected for this alternative, a relatively small amount of effluent material would be discharged, (Section V.D.14. a.1)b) and a small demersal area would be affected. Therefore, impacts to fish and shellfish are expected to be very low.

Conclusion. Fish and shellfish that occupy surface and nearshore waters at least some portion of their life history are expected to suffer low ecological losses. Local impacts to pink and chum salmon, and king crab could be high but would recover rapidly. Overall, regional impacts to fish and shellfish would be low.

Cummulative Impacts. In the unlikely event that all tracts in the St George Basin are leased and developed during the life of the proposal, the expected number of oilspills is 3.2 for spills greater than 1,000 barrels and about 1.4 for spills greater than 10,000 barrels from OCS activities.

Additionally, tankering of oil through the St. George planning area would occur as a result of the proposed Federal OCS sales in (Barrow Arch, Hope Basin, Norton Basin, and Navarin Basin) and State nearshore and onshore leasing as well as crude from the Canadian Beaufort. Considering the resource estimates for total resources developed in these planning areas, it is possible that over

3 billion barrels of crude oil could transit the St. George area via tanker. This would significantly increase the oilspill risk to this area. Given this increase in the number of expected spills, it is possible that one large spill may follow another, or that spills may occur in subsequent years in the same area. Therefore, the cumulative impact of these oilspills on fish populations probably would cause moderate ecological loss to fish or shellfish populations that inhabit surface or nearshore waters at least some time during their life cycle. Of primary concern would be the salmon and crab populations which occur along the north side of the Alaska Peninsula which would be nearest the tanker traffic pattern through Unimak Pass.

Fish populations are also stressed by commercial fishing pressure which, combined with the cumulative oilspill impact, could result in a moderate ecological loss to certain species (primarily salmon) unless management action (i.e., area closures) is taken to relieve the harvest pressure. Overall, the expected regional impact on fish populations due to the cumulative impacts is moderate.

When compared to the cumulative impacts (tankering and fish harvest pressure), the contribution of the proposal is minor. The contribution of this alternative when only the resources described in the alternative (as opposed to total development of OCS resources) are developed, would be slightly less.

(2) Commercial Fisheries: The St. George Basin comprises one of the most valuable commercial fishing areas in Alaska. In 1979, over 240 million pounds of salmon, halibut, and crab worth $187 million to commercial fisherman were landed in this region (Terry et. al., 1981). Additionally, the 1978 bottom fish harvest exceeded 2.5 million metric tons. A large portion of the bottom fish catch was by foreign fishermen (Japan, USSR, and Korea). This represents better than half of the total Alaska landings. Of special concern are the productive salmon fisheries of the Alaska Peninsula (Izembek Lagoon, Bear River, and Sandy River) and the king crab fishing areas of the southeast Bering Sea.

Impacts on commercial fisheries under the proposal would result largely from competition for labor, ocean space-use conflicts, competition for infrastructure services, and reduced catch due to ecological loss (as discussed above). This analysis (except for reduced catch) draws largely from Tobolski et. al, (1981), which provides an analysis of fishing industry impacts in the Bering Sea.

Over the life of the proposal, about 1.8 oilspills greater than 1,000 barrels and about 0.8 oilspill greater than 10,000 barrels are expected to result from Alternative I-1. Since fish resources are expected to sustain low ecological losses (see discussions in Section V.D.14.a.2), the commercial fishing industry could sustain low economic losses because there would be a loss in potential catch. These potential impacts are expected to be short term in duration and, given the low number of expected spills, only occur once during the life of the field.

A large oilspill could impact commercial fishing by causing a disruption in space and time. It is unlikely that commercial fisherman will harvest in the area of an oilspill because 1) their boats and gear may be contaminated, 2) they may be restricted from the contaminated area while clean-up efforts are

underway, and 3) direct coating and incorporation of petroleum hydrocarbons can cause tainting of marine organisms, rendering them undesirable or unmarketable. This disruption in fishing would affect the nearshore salmon and shellfish fisheries to a greater degree than the offshore demersal fisheries. In the unlikely event that a large oilspill contacted this area during the height of the fishing season (varies by species), a moderate to high impact would result on the local fishery (especially on the salmon fishery). Regional economic impacts, however, would be low, because such an event would have to occur during a narrow time window (June-July for peninsula salmon) which reduces the probability of occurrence.

A big portion of fishery-related labor in the region is made up of fishermen whose earnings are lower than may be paid to unskilled workers in the oil and gas industry. This is likely to lead to a high willingness of this labor pool to transfer to OCS employment. However, because the number of jobs to which they would be attracted is limited, and because there is a considerable excess in the number of crewman available for fishing jobs, the impact due to labor competition would be very low.

Ocean space use conflicts consist of loss of and damage to fishing gear, loss of access to fishing grounds, and collisions among vessels. Fishing gear conflicts may result from 1) oil fouling of gear (as stated above), 2) catching or "hanging" gear (trawl nets or scallop dredges) on obstructions such as pipelines and bulk material inadvertantly discarded by industrial operations, and 3) vessel traffic and seismic operations (trailing long seismic cables) in areas where pot-fishing (crab) and longlining (halibut) occur. Secondary economic impacts from gear conflicts occur from fishing time lost while waiting for repair or replacement of gear. This may be especially acute in these remote areas in Alaska where replacement gear must be shipped from distant suppliers and transportation services are limited.

The analysis for the St. George Basin (Tobolski, 1981) which projected the number of gear damage/loss claims that would be submitted as a result of oil and gas development concluded that there would be 5 claims ($90,000 in 1980 dollars) per year intially increasing to 12 claims ($216,000 in 1980 dollars) per year during full development. These results were based on the estimated future fishing effort and the projected number of oil and gas installations (platforms) with claim frequencies established for these parameters from North Sea historical data. If these figures are assumed, this would represent a total economic loss about 0.1 percent to the regional fishermen. However, this would represent a very high loss to individual fishermen.

The placement of three platforms in the planning area would result in a loss of access of fishing grounds in the amount of 706 hectares (considering a 500 meter buffer radius for the platform). This represents an insignificant loss to the fishing industry.

Attempts by domestic fishermen to exploit the hitherto foreign dominated demersal fish resources will introduce new vessel traffic in the planning area. Similarly, the OCS supply and support vessels will bring additional traffic, leading to increased chances of vessel collisions. This may be especially true in restricted areas such as the entrances to Dutch Harbor. However, the analysis for the St. George Basin (Tobolski, 1981) concluded that only one collision would be expected in 20 years due to increased OCS vessel traffic.

Such a collision may render only slight to moderate damage or even a complete loss (sinking) of one or both of the vessels involved. If the latter is the case, especially for a larger vessel (catcher-processor), the impact to the fishing industry could be moderate considering the 20 year life of the field.

The most likely damage, however, would be much less because most collisions do not involve sinking or major damage. Statistics of casualties in U.S. waters show that the average value lost per vessel involved in a collision is approximately $22,137 (1980 dollars). If a fishing vessel is involved in a collision during the life of the proposal, then the annual loss equivalent would be $1107. The expected level of impact to the fishing industry, therefore, is very low.

Impacts resulting from competition for infrastructure services would most likely occur in the vicinity of Dutch Harbor. In this case competition of these services would be expected. However, given the low level of OCS activity anticipated under this alternative, such conflicts would not be severe and impacts would be low.

Conclusion: As a result of the proposal the level of impact on the commercial fishing industry in the St. George Basin is expected to be low. The loss to some individual fishermen, however, could be high.

Cumulative Impacts As previously noted, the cumulative impacts on fish resources (salmon, crab) in the St. George planning area would be moderate. This would result from the increased number of expected spills that result from the tankering of oil from existing and future Federal and State leases to the north and total development of all hydrocarbon resources in the St. George Basin. As a result of this moderate ecological loss, the fishing industry would be expected to sustain a moderate economic loss.

The proposal contributes approximately 56 percent of the oilspills expected from total development of the hydrocarbon resources in the planning area, 53 percent of the exploratory and development/production wells, and 75 percent of the platforms. OCS development within the planning area is not the major contributor to cumulative impacts on commercial fisheries. As noted above tankering of hydrocarbons from other areas through the basin and fuel spills from commercial fishing activity are and will continue to be the potentially major contributors to oil pollution in the area. The amount of development from OCS activity within the area is a minor contributor to cumulative impacts in the region whether only the resource development anticipated to result from the adoption of proposal occurs or the development of all hydrocarbon resources in the planning area occurs.

b) Endangered Species: There are eight endangered whale species which do occur or may occur in the St. George planning area. They are the gray, humpback, fin, sei, blue, sperm, right, and bowhead whales. Two avian endangered species, the Aleutian Canada Goose and the peregrine falcon, may occur seasonally or as transients in coastal areas near the St. George Basin. Other species listed as endangered may occur very rarely, if at all. These include the short tailed albatross and eskimo curlew. These two species have been recently reported in or near the St. George Basin.

Section V.C.13.a.2.b) contains a discussion of the Section 7 Consultation process, conducted pursuant to the Endangered Species Act of 1973, concerning OCS Leasing and Exploration in the Bering Sea Region. Appendix G. of the FEIS for Proposed OCS Lease Sale No. 57 in the Norton Sound, contains the text of the Biological Opinion received subsequent to that Consultation.

The species most likely to interact with oil and gas activities, and which has the greatest potential for being affected by oilspills or disturbance in the St. George planning area, is the gray whale. Most of this population migrates through Unimak Pass just south of the St. George Basin. Sizable numbers of humpback whales and some fin and sei whales also migrate through the pass and feed within the basin, particularly along the shelf break and near the Pribilof Islands. The oilspill trajectory and risk analysis data for the Sale 70 EIS indicates that it is very unlikely that oilspills originating in this area would significantly affect endangered cetaceans or their habitat. However, it is not known at this time whether significant population-wide effects of noise and other potential disturbance on endangered whales could occur as a result of the proposed OCS Sale 70 and proposed OCS Sales 89 and 101. A more definitive analysis of effects of oil and gas development and production on endangered whales cannot be made prior to the discovery of hydrocarbons and the development of a production plan. If leasing occurs close to or adjacent to the Pribilof Islands and Unimak Pass, the potential for significant impacts from oilspills and disturbance on endangered whales increases.

The oilspill risk analysis and other impact assessments in the OCS Lease Sale 70 EIS indicate that endangered avian species, peregrine falcon, and Aleutian Canada goose are unlikely to be significantly affected by exploration oil and gas activities in the St. George Basin.

Conclusion. Overall endangered whales could be moderately impacted by oil and gas activities in the St. George Basin under the proposal.

Cumulative Impacts. In the unlikely event that all oil and gas resources of the St. George planning area are leased and all resources subsequently are developed over the life of the field, the expected number oilspills is 3.2 spills greater than 1,000 barrels and 1.4 spills greater than 10,000 barrels. An additional unknown quantity of oilspills is expected to result from tankering from Federal OCS lease sales in the Bering and Arctic planning areas. Additional projects or activities that could significantly contribute to cumulative impacts in the planning area are commercial bottom fishing. These total projects or activities could affect endangered whales and birds through oilspills, disturbance, and commercial harvest of food sources. The cumulative impacts of these oil spill events, projects and activities are expected to produce a low impact to endangered birds and moderate-to-high impact on endangered whales in the St. George planning area.

In relation to the unlikely case of all resources in the planning area leased and developed, the alternative contributes 56 percent of spills greater that 1,000 barrels and 57 percent of spills greater than 10,000 barrels. These proportions are reduced considerably when the tankering from other Federal OCS planning areas (and State lease sale areas to an unknown extent) are considered. Here oil spills from St. George leasing contributes little to the total cumulative case. Consequently, the most important causal agent for potential cumulative impacts on endangered birds is tankering from other

Federal lease sales. The contribution of the proposal to cumulative impacts on endangered whales and birds in the planning area is insignificant in the unlikely event that leasing and development of all resources in the planning area is considered as part of the cumulative case. The contribution of the proposal to cumulative impacts on these species when total development of resources in the area is not considered is substantial but, again, not the critical contributor.

c) Habitats and Resources of Special Concern: Over 3 million seabirds highly vulnerable to oilspills (greater than 85% of total seabird nesting population, about 4 million in the planning area) occur in the St. George Basin. About 1.22 million or 76% of the world's population of vulnerable northern fur seal also occurs in the planning area. Sizeable numbers of sea otter, sea lion, and harbor seal are present as well. Habitats of special concern for the above species include: marine waters within 50 nautical miles of the Pribilof Islands as foraging habitat for highly vulnerable seabird populations and fur seals breeding on the Pribilofs; marine waters near the eastern Aleutian Islands or Fox Island group where 50% of the Alaskan population of whiskered auklet, a species endemic to the Aleutian Island, nest; and Unimak Pass which is the migration corridor for marine mammals and migratory birds.

The major adverse impacts of OCS activities from the proposal could come from oil pollution of the marine environment and man-made disturbance.

The species most likely to be significantly affected by potential impacts as a result of OCS oil and gas activities in the St. George Basin are diving sea bird species such as murres, auklets, puffins, and guillemots. These species are historically known to suffer high mortalities from oil spill events in other parts of the world. Of particular concern is the whiskered auklet, a species endemic to the Aleutian Islands. If a major foraging habitat of this species is impacted and as a result substantial numbers are lost, the species may become endangered. Also major Alaskan populations of murres, and puffins could lose substantial numbers if a major spill occurred in the planning area. Among the marine mammals, fur seals breeding on the Pribilof Islands could suffer significant losses if a major spill reached marine waters near the island during the summer. Fur seals and other marine mammals could be affected if a spill event occurred in Unimak Pass during the spring or fall migration.

Conclusion. Because of the critical importance of the St. George planning area to most of the vulnerable northern fur seal population and because of the high or critical importance of this area to seabird species highly vulnerable to oil pollution, habitats and resources of special concern are expected to be moderately impacted by the potential effects of OCS oil and gas activities in the St. George Basin under the proposal.

Cumulative Impacts. In the unlikely event that all potential oil and gas resources of the St. George planning area are leased and subsequently are developed over the life of the proposal, the expected number oilspills is 3.2 spills greater than 1,000 barrels and 1.4 spills greater than 10,000 barrels. An additional unknown quantity of oilspills is expected to result from tankering from Federal OCS development in the Hope, Norton, Barrow Arch and Navarin planning areas. In the Norton and N. Aleutian areas additional

projects or activities could contribute to cumulative impacts in the planning area are commercial bottom and foreign fishing and commercial vessel traffic. These projects and activities could effect birds and mammals through oilspills, disturbance, and commercial harvest of food sources. The cumulative impacts of the oilspill events, projects and activities are expected to produce a high impact to birds and mammals in the St. George planning area.

In the unlikely event that all resources in the planning area are leased and developed, the proposal contributes 56 percent of spills greater than 1,000 barrels and 57 percent of spills greater than 10,000 barrels. These proportions may be overshadowed when the tankering from other Federal OCS planning areas and State lease sale areas (to an unknown extent) are considered. Here oil spills from St. George leasing contribute moderately to the total cumulative case. The most important causal agent for potential cumulative impacts on birds is tankering from other Federal OCS resource areas and the Canadian Beaufort development. The contribution of the proposal to cumulative impacts on birds and mammals is substantial when not considering total resource development (all resources are leased and developed) in the planning area as part of the cumulative case.

d) Air Quality: A discussion of the primary factors used in assessing onshore air quality impacts which may result from OCS-related activities and the method employed in quantifying the impact on this planning area are described in Section I.A.3 of this document.

It is estimated that 19 exploratory wells will be drilled to identify the resources and 78 development/production wells drilled and 3 platforms installed to develop the resources under this alternative. It was assumed, for the purposes of analysis, that production from an average platform would be 4.4 million barrels of oil and 24.4 billion cubic feet of gas per year. The resource is expected to be transported to shore via subsea pipelines and then transported to ports outside the region. Estimated representative emmissions for exploration/development are provided in Table V.D.14.a.2)d)-1. This information is derived from Table V.A.3-1.

Table V.D.14.a.2)d)-1. Estimated Representative Emissions

Activity	Production at Platform (Tons per year)				
	VOC	NOx	TSP	SO2	CO
oil/gas	26	377		0.5	143
barging	None				

It is estimated that platforms located within 20 miles of the coast would require emission controls. As development of the resources for the proposal is expected to occur beyond this distance emission controls are not expected to be required. At least one new gas processing plant is needed for development of the resources in St. George Basin and would be located on the south side of Alaska Peninsula (see Land Use). This will not influence air quality in the planning area, but would impact the peninsula south coastal area.

A very low qualitative impact is expected from routine emissions. The area is in attainment for all pollutants. Because development would be well offshore,

blowouts, oilspills, and fires would not likely impact the onshore air quality unless they lasted for several days.

Any emission sources which would adversely affect the onshore air quality would be subject to mitigation required by EPA and the State, if located onshore, or by DOI, if located on the OCS. ERG (1981) discusses mitigation measures for OCS facilities.

Conclusion. The level of expected regional impacts is very low.

Cumulative Impacts. It is estimated that a total of 0.7 billion barrels of oil and 3.9 trillion cubic feet of gas exist in the entire St. George Basin Federal OCS planning areas. In the event that total development of all Federal reserves occurs over the life of this proposal, new platforms with 142 wells would be required. It is very unlikely that this magnitude of development would occur over the life of this proposal.

The major factors affecting the onshore air quality near the planning area as a result of this development are 1) the number of new wells drilled, 2) the location of the platforms, 3) the timing of the activities and 4) the instantaneous local meteorological conditions. The offshore development of this proposal contributes moderately to regional OCS activity related cumulative air quality changes.

The increased oil and gas activity described in the proposal would occur simultaneously with other industrial projects in the region and industrial growth in Unalaska related to the bottom fishing industry. Non-OCS development related growth in the region would be primary contributor to development in the area and air pollutant concentrations. Tankering of crude through St. George from other OCS areas and the Canadian Beaufort will also influence air quality in the area. The proposal is a minor contributor to cumulative impacts to regional air quality.

Overall, cumulative regional air quality impacts are expected to be low, local impacts would be low. However EPA rules associated with the Clean Air Act and the DOI air quality rules have provisions to minimize these impacts.

e.) Recreation and Tourism: There are several recreational areas adjacent to the St. George planning area. These include Cold Bay, Unalaska/Dutch Harbor, St. George, St. Paul. In addition to parks and villages, hunting and fishing opportunities draw recreation lists to the area. Hikers and climbers are also drawn to the Alaska Peninsula and Aleutian Islands.

Typically, impacts on recreation may occur from 1) competition in the use of existing recreational facilities, 2) recreational hunting and fishing conflicts between local residents and OCS-related or induced population, 3) displacement through reassignment of use of the lands and sites of recreational and/or park value, or reassignment of local and regional recreational facilities to industrial uses. The likelihood and magnitude of these types of recreational impacts depends primarily on the location and magnitude of the OCS activities and personnel onshore, together with any regulations and mitigating measures used to avoid adverse interaction. The population associated with the proposal is expected to be located in an enclave and to leave the area during "rest

periods" (see following section, Socioeconomic Factors). Therefore, they are not expected to be significant competitors for recreational opportunities in the region. The enclaving of OCS facilities is also not expected to intrude on recreational land uses.

Conclusion. The impacts of OCS development on recreation and tourism in this area are expected to be very low.

Cumulative Impacts. Small boat harbors at St. Paul and Unalaska, a fishing community at Cherenofski Point, Federal OCS sales, and the State's proposed sale in southwest-Bristol Bay Uplands together would likely change the visual, wilderness, and recreational value of the area over the life of the proposal. Increased use of recreational facilities will stress existing opportunities. The expected impacts would be low and long-term. OCS development is a minor contributor to recreational use and to visual resources. The four platforms anticipated for full development of the resources are a major change but not a significant one.

f) Socioeconomic Factors: The probability of the discovery of commercial quantities of petroleum resources in the St. George Basin area is considered to be 64 percent, and the mean estimates of discoveries expected to result from the proposed 5-year leasing program are 390 million barrels of oil and 2.17 trillion cubic feet of natural gas.

Most petroleum workers in the St. George Basin OCS area would probably live in isolated dormitories during work periods, and would commute during frequent rest periods to permanent residences in other regions of Alaska or out of state. Most in-state commuters would reside in the Anchorage region. The long-term employment impact resulting from the proposed 5-year leasing program would total about 800 additional jobs statewide, and the corresponding population impact would be about 1,600 additional permanent residents of Alaska.

Conclusion. Most of the socioeconomic impacts, in the form of 1,600 additional people in the State, are expected to occur in Anchorage, which could handle the increase without serious strain. Overall, impacts are expected to be low.

Cumulative Impacts. An estimated 710 million barrels of oil and 3.94 trillion cubic feet of gas are expected to be present in the St. George planning area. In the unlikely event these resources were developed over the life of the proposal, approximately 900 new jobs statewide and 1,800 new residents would settle in Alaska. As noted for the proposal, OCS socioeconomic growth is not expected to occur adjacent to the St. George planning area. The area is not expected to experience significant impacts associated with either the proposal or total development of the resources.

The principal non-OCS activity expected to result in the employment and population growth will be the rapid expansion of the U.S. bottomfish industry, which is expected to largely displace the huge foreign bottomfish operation in the area by the year 2000. Impacts from the U.S. bottomfish industry expansion are expected to increase total employment and population in the entire Aleutians Islands census division by 100 percent to 400 percent. Impacts on the key community of Unalaska/Dutch Harbor are estimated to increase resident employment and population by 300 percent to 1000 percent by the year 2000.

Bottomfish development is expected to account for well over half of the cumulative impacts in the Aleutian Islands census division.

OCS activities in the North Aleutian Shelf, Navarin, Norton Basin, and as many as seven other OCS planning areas will also contribute to employment and population growth in the Aleutian Islands census division. Although the combined impacts from these other OCS activities could be quite large relative to the existing (1980) levels of employment and population, their combined impacts are expected to be less than the impacts expected from expansion of the U.S. bottomfish industry.

OCS activities in the St. George Basin area will have important impacts in the Aleutian Islands census division, but these impacts will be much less than those expected from expansion of the U.S. bottomfish industry. In addition to the impacts on adjacent land areas, St. George Basin OCS development will generate employment and population impacts in distant parts of Alaska, because most petroleum workers in the area will live in isolated dormitories during work periods, and will commute during frequent rest periods to permanent residences in other regions of Alaska or out of State. Most in-state commuters will live in Anchorage. Resident employment impacts in Anchorage and other distant parts of Alaska could total 800 jobs for the mean expected resource development level, or 900 jobs in the unlikely event of total development of all area resources. Population impacts would be approximately twice as great as the increases in resident employment.

The impact of the proposal on the resident employment and population would be significant in the sense that potentially significant short-term stress would be imposed on public and private services and facilities in the adjacent land areas (particularly in the Aleutian Islands census division). This would be true only if enclaving did not occur with either at the mean expected resource development level or in the unlikely event of total development of all area resources. However, enclaving is expected and thus the contribution of OCS is minor.

g) Native Subsistence Cultures: The St. George Basin planning area encompasses a potential village impact area extending easterly along the Alaska Peninsula beyond the village of Nelson Lagoon, westerly along the Aleutian Islands chain to Nikolski and seaward of the Aleutian Islands to include the Pribilof Islands of St. Paul and St George. Villages in this area which are inhabited by Aleut people include St. Paul, St. George, Nikolski, Akutan, False Pass and Nelson Lagoon. The villages south of the Alaska Peninsula, described in the Shumigan planning area, could also be impacted by OCS activities in the St. George Basin due to commercial fishing patterns and relationships within extended families. The two villages of the Pribilof Islands are about 90 percent Aleut (a total of about 625 people). Nelson Lagoon, False Pass and Nikolski are also about 90 percent Aleut (a total of about 150 Aleut people). In Unalaska, the largest seafood processing community in the area (population of 1,322 in 1980 Aleut people are a minority, representing 15 percent of the population (200 people). The village of Akutan is the next largest seafood processing site, where Aleuts comprise 40 percent (67 persons) of the population. The villages and communities named here comprise a total Aleut population of 1,042.

Village subsistence and sociocultural systems are discussed fully in the OCS Lease Sale 70 DEIS. Subsistence is practiced throughout the planning area within the context of Aleut-Russian culture, with variations existing due to the availability of different resources and the extent to which wage employment interrelates with subsistence activities. Primary subsistence resources on the Pribilof Islands are fur seal, sea lion, halibut and migratory birds. The commercial fur seal harvest carried out annually (managed by the United States Government) on St. Paul Island (with subsistence harvest of fur seals permitted only on St. George Island) has contributed since Russian times to an adaption of Aleut maritime hunting cultures unique to the Pribilof Islands. This system acknowledges a hierarchy of status and prestige achieved through stages of accomplishment and demonstrated proficiency in different phases of the onshore fur seal harvest. Subsistence harvests carried out throughtout the year onshore and nearshore similarly attribute status to the best hunters.

Impacts on the subsistence culture of the Pribilof Islands could occur if marine mammals, especially the fur seals, were affected by OCS activities. Regardless of potential effect on fur seals biologically, the scientific management of the species (as demonstrated by the closures of commercial sealing on St. George Island to establish a control group to measure the effects of sealing on St. Paul) by the National Marine Fisheries Service suggests that any unknown effects from habitat or species oiling, noise or other causes could result in the closure of harvest for the period of time necessary to determine effects. Such an event or events over the life of the field could cause family hardship on the Pribilof Islands in terms of subsistence resources loss and threaten the stability of individual and family systems of value and orientation.

Village subsistence resources in Nikolski, Unalaska and Akutan are primarily salmon, seal, sea lion (when available), intertidal or reef organisms and migratory waterfowl. The same is true on the Alaska Peninsula, except that caribou (and perhaps moose) are substituted generally for sea mammals. The Aleut people of Nikolski live in a rich biological environment that provides subsistence resources available for year-round harvest, a primary factor for supporting the subsistence economy of the village. Aleut people in Unalaska and Akutan, to the contrary, live in an environment of wage labor combined with seafood (primarily shellfish) processing. Subsistence practices are carried out at each location, but cultural impacts from the proposal may be marginal to the changes already induced by the seafood processing industry (see OCS Lease Sale 70 DEIS for an historical perspective on change in these communities).

Despite the variation in subsistence resource use in the planning area, disruption in the access to or availability of locally used marine subsistence resources from the effects of localized oilspill events could have major impacts on village sociocultural systems. The statistically derived number of spills equal to or greater than 1,000 barrels is 1.8 for the planning area. The comparable statistics for spills equal to or greater than 10,000 barrels is 0.8. Spills reaching areas critical to specific marine resources used locally or within the immediate vicinity of the villages, where beaches, lagoons or wetlands are intensively used for subsistence resource harvest, could increase the possibility for direct and indirect impacts on local sociocultural systems to be realized. Spills affecting the commercial fur seal, crab or salmon harvest variously within the planning area likewise could effect the total livelihood pattern found in the planning area.

Direct and indirect impacts on the villages from population growth associated with the proposal are unlikely. Location of terminal, processing or other facilities on the Pribilof Islands would require a conscious choice by the Aleut people living there, since their ANCSA Native village corporations own most if not all the land on the islands. A terminal facility located on the south side of the Alaska Peninsula was discussed under the Shumagin planning area, with similar likelihood of impact. Facilities located at Unalaska, making use of Dutch Harbor for at least a marine supply and support base, could impact the community, but less so than expected from the centering of bottomfish processing there to augment the crab processing industrial establishment. Since Aleut people already are a minority of the population in Unalaska and have a segment of the population which is marginally involved in the fish processing economy, effects from OCS-induced population growth outside an enclave could be marginal to social fragmentation already existing in the community.

Conclusion. Impacts on village subsistence cultures over the life of the field are expected to be moderate to high in Nikolski and on the Pribilof Islands, based on the degree of subsistence resource dependency found in Nikolski and the potential for unknown oiling effects on fur seals or their habitat to result in closure of the commercial and/or subsistence harvest for an indefinite period of time. Elsewhere, impacts on village subsistence cultures should be low to very low. Overall, the level of expected impacts is moderate to high.

Cumulative Impacts. In the unlikely event that all areas of the St. George Basin planning area are leased and all resources subsequently are developed over the life of the proposal, the expected number of oilspills is 3.2 spills greater than 1,000 barrels and 1.4 spills greater than 10,000 barrels. An additional unknown quantity of oilspills is expected to result from tankering from Federal OCS development in the Barrow Arch, Hope, Norton, Navarin, and North Aleutian Basin planning areas, as well as from development of State of Alaska territorial waters. Additional projects or activities that could contribute to cumulative impacts in the planning area are significant expansion of the bottomfishing industry in Unalaska, construction of the new fishing community of Chernofski and activities associated with port construction and expansion at St. Paul and Unalaska. These total projects or activities could effect native subsistence cultures in the following ways.

Oilspill damage or other disturbances to local subsistence resources could divert, displace or reduce the availability of subsistence resources. Major disruption in the access to or availability of local subsistence resources where they are traditionally found could, 1) disrupt traditional subsistence patterns to an extent (reducing subsistence catch of the resources customarily used), 2) prevent the pursuit of subsistence practices by segments of the population due to the costs of using an increased subsistence range, 3) disrupt traditional (cultural and spiritual) patterns of obligation fulfillment for kinship-based assistance networks and care of the elderly and 4) induce chronic stress and anxiety over imbalances in nature, i.e. the fear of further changes in such relationships, and the inability to do anything about it. Impacts from such effects could include increased disease, malnutrition and mental disorders, family breakup and conflict, substance abuse, and generational conflict. Localized impacts could be magnified within the region through the

breakdown of customary inter-village (through family networks) resource distribution patterns and obligations.

The propensity for increased risk of impact from oilspill events as a result of tankering from other proposed Federal OCS lease sale areas could selectively increase the impact on native subsistence cultures. This tankering could be expected to impact the Pribilof Islands and Nikolski to a lesser extent than other villages in the planning area, since these locations are fairly well removed from potential tanker routes. Villages located near Unimak Pass (Akutan, False Pass, Nelson Lagoon) could be more vulnerable to oilspill risk, since this passage through the Aleutian Islands chain would be the most likely passage for tankers to exit the Bering Sea. In the cumulative case, impacts to native subsistence cultures could be expected to incur moderate to high impact levels near Unimak Pass and high to very high impacts on the Pribilof Islands and in Nikolski.

In relation to the unlikely case of in which all OCS hydrocarbon resources in the planning area are leased and developed, the alternative contributes 56 percent of spills greater than 1,000 barrels from OCS development in the area and 57 percent of spills greater than 10,000 barrels. The most important causal agent to potential cumulative impacts on native subsistence cultures is tankering from offshore development in the Beaufort, Chukchi and northern Bering Seas. The contribution of the alternative to cumulative impacts is marginal in either the case of only the resources described as developed or all resources leased and developed in the planning area. The proposal is however a major contributor, as indicated above.

3) Impacts on Other Management Plans: Coastal Zone Management: With the exception of Unalaska (a first class city), and several native villages, the Aleutian Islands, which form the southern edge of the St. George Basin, are an unorganized borough. Presently, a Coastal Resource Service Area does not exist for the area that includes the Aleutian Islands west of Unimak Pass. Also, the Pribilof Islanders have made no effort to form a CRSA. The Aleutian Islands are primarily national wildlife refuge lands now, but there are native land claims on them. The extent to which the region would be ready to deal with oil and gas activities in the absence of a regional comprehensive land use or CZM plan is uncertain. The provisions of the ACMP will apply.

4) Unavoidable Adverse Impacts: Oilspills, discharges of drilling effluents (muds, cuttings, and formation waters) and sewage disposal would result in unavoidable adverse impacts to water quality under the proposal. Impacts from all the above except oilspills could be mitigated by EPA NPDES regulation.

Water supply would be unavoidably adversely affected by this proposal. Limited supplies would be consumed by OCS-related infrastructure and development, if enclaving of facilities does not take place as expected. Enclaves would draw upon available sources and not adversely affect existing uses of supplies elsewhere in the region.

The unavoidable adverse impact on land use would be a reduction in the amount of land available for other uses. Occupation of land by OCS-related activities

and structures would be minimal and enclaving of facilities is expected to occur.

Coastal ecosystems would be unavoidably adversly affected by oilspills and various discharges as mentioned above for water quality. The level of impact would be restricted both geographically and temporally.

The proposal would have unavoidable adverse impacts on fish by oilspills contacting nearshore habitats or eggs and larvae which occur on or near the surface. Oilspills would also affect commercial fishermen by reducing the number of harvestable fish. These impacts are expected to be minimal.
Birds, marine mammals, and endangered species would also suffer unavoidable diverse impacts from oilspills. The level of impact would depend on when and where the oilspill occured. Regional endangered species consultation with NMFS and FWS is required and would be conducted as needed.

Recreation and tourism resources could be adversely effected unavoidably by damage to visual resources through the intrusion of onshore support infrastructure and road systems, nearshore systems of causeways, pipelines and drilling islands, offshore oil and gas platforms, and vessel and aircraft traffic supporting such operations. Such effects would be localized and may serve as an attraction to a segment of the recreation and tourism population.

Cultural resources offshore, such as housepits, burins, scrapers, arrowheads and other artifacts, could be unavoidably destroyed through OCS operations; the complex dynamics of the marine environment already may have resulted in the destruction of many of these resources. Cultural resources located onshore could be lost or damaged by public pilfering or indiscriminate exposure of artifact sites.

Introduction of urban and industrial land uses, except for regional urban centers, would change the character of isolated, de facto wilderness areas, but impacts would be isolated and small in relation to the total area involved. Where urban centers are involved, land use demands generated by OCS activities could unavoidably produce adverse effects derived from the rate and relative scale of demand. Land speculation and price inflation could be experienced as well as interruptions in community facilities and infrastructure during the period necessary for such aspects of land development to catch up with increased land use demands. However, enclaving of activity substantially decreases the probability of such impacts occurring.

Native subsistence cultures could be unadvoidably adversely affected through accidental oilspills and an increase in population, causal agents which could affect the access to and availability of subsistence resources. Such impacts have been discussed previously. Indirect adverse effects could be caused by nature of kinship-based social networks existing between regional centers and villages and the periodicity of urban-village migration customary in village regions. Localized effects in villages could have adverse effects throughout the village region. Disruption of customary urban-village migration patterns, through effects such as urban housing shortages, price inflation or reduced supply of public services, could cause hardship for those segments of the population unable or unwilling to adapt to such changes. This could contribute to social disorder and disorientation of cultural value systems. If enclaving

does occur dispersion of OCS activity and employment will not occur and only oilspill damage to subsistence cultures will result.

5) Relationship Between Local Short-Term and Uses and Maintenance and Enhancement of Long-Term Productivity:

The short-term effects and uses of various components of the environment are related to long-term effects and the maintenance and enhancement of long-term productivity. The effects of the alternative would vary in type, intensity, and duration, beginning with preparatory activities (seismic data collection and exploration drilling) of oil and gas development, and ending when natural environmental balances can be restored.

Biological productivity would be lost in the short-term on all onshore lands involved in the proposal. These areas could be returned to productivity in the long-term with proper management. Restoration may not be entirely feasible; however, the overall loss would be a minor adverse effect. The direct land requirements would show in both the short-term and the long-term because of disturbance. Major construction projects would cause definite changes in both the short-term and long-term. Some species may have difficulty repopulating and could be displaced.

Short-term oil pollution and the possibility of long-term cumulative oil pollution impacts could cause serious adverse effects on all components of the marine ecosystem, including fisheries. While restoration would allow fisheries production to regain original levels, any reduced annual harvests during the life of the project would be irretrievably lost. The extent is not known presently, but the potential must be recognized.

Freshwater pollution from onshore activities is a short-term effect. The long-term decrease in water quality may be considered to be a tradeoff for obtaining oil and gas resources.

The biota would be threatened in the short-term by potential oil pollution. Direct mortality could be significant through the combined effects of harassment by humans and the increased volume and frequency of noise from vessel traffic or overflying aircraft. In the long-term, such disturbances could alter behavior patterns and drive fauna away from traditional feeding and breeding grounds or to other critical areas within their range, reducing species populations over a long period of time.

Habitat destruction could cause a reduction in subsistence species which could threaten the regional economy. The improved accessibility to primitive areas from increased construction is a short-term result of this alternative. The overall widerness value of the coast may decrease from increased land use if settlement and facilities are not enclaved. Increased human populations in the short-term could change the regional native culture in the long-term. The subsistence way of life could be modified and population shifts could occur. The overall changes cannot be termed positive or negative, except by those affected.

Archaeologic and historic values discovered during development would enhance long-term knowledge. Overall, finds may help to locate other sites, but destruction of artifacts would represent long-term losses.

Consumption of offshore oil and gas would be a long-term use of non-renewable resources. Economic, political, and social benefits may accrue from the availability of oil and gas. Most benefits would be short-term and would decrease the nation's dependency on oil imports.

The production of oil and gas from the planning area would provide short-term, critically needed energy, and perhaps, provide time either for the development of long-term alternative energy sources or substitutes for petroleum feedstocks. Petroleum development in these areas may mean the irreplaceable loss of some fisheries production. The maintenance and enhancement of long-term producitivity would depend on efforts to control water quality levels. Regional planning would aid in controlling changing economics and populations, and thus, in moderating any adverse impacts.

6) Irreversible and Irretrievable Commitment of Resources

a) Mineral Resources: Resources discovered would be irretrievably consumed.

b) Biological Resources. Commercial fishery losses may occur principally by oilspills interfering with salmonid migrations or by their direct contact with larval fishes and/or their planktonic food supplies. Any losses of commercial fishing incomes attributable to this alternative would be irreversible and irretrievable to the extent they are uncompensated. Fatalities of commercial finfish and shellfish, as renewable resources, would be an irretrievable loss to the economy.

Increased air and ship traffic and onshore activites, as well as potential habitat degradation or reduction in available food resulting from oil and gas industry operations could displace birds and mammals into less favorable environments, ultimately resulting in reduced population levels. Displacement could become irretrievable if permanent alterations of the environment were maintained by such activities.

c) Endangered Species: As a result of the proposal, it is possible that endangered whales could be subjected to irreversible direct and indirect effects of oilspills, disturbance due to noise and other human activities, or losses and/or deterioration of habitat due to facility developments. Whether such effects would lead to permanent (irreversible) losses of whale resources is unknown.

d) Social Systems: Village subsistence practices could be affected irreversibly by the displacement of subsistence resources from locally-used customary habitat or by the reduction of resources through the modification of favorable habitat. The displacement could be irretrievable if the effect was maintained over time. Irreversible changes in cultural values and orientations could occur from the proposal, but the irretrievable nature of these changes to sociocultural systems is unknown.

A high growth situation could cause increased housing costs and shortages and could place extreme demands on utility services such as electrical power, water, sewage, and solid waste disposal. Attempts to provide basic service levels for the above items to meet increased population levels could force

communities to forego improvements to the existing services. This would occur if the population associated with the proposal was not enclaved.

Due to the increase in air and marine traffic generated by this alternative and, importantly, the severely inclement weather to which the area is prone, it is highly probable that there would be an increase in transportation related fatalities over the life of the proposal.

e) Economic Systems: The only commitment of economic resources that could be considered irreversible and irretrievable would be the economic risk, resulting from OCS activity, of destruction of commercial fisheries resources or destruction of other fauna or flora used for subsistence by area residents.

f) Cultural Resources: The possible destruction of an underwater OCS cultural site would in an irreversible and irretrievable loss of prehistoric information about human occupancy.

b. Alternative I-2

Resource estimates and attendant activities, and oilspill probabilities are the same in the St. George Basin for this alternative as for Alternative I-1. This being the case, impacts resulting from this alternative would be the same as those described for Alternative I-1. In addition,the discussions regarding impacts on other management plans, unavoidable adverse impacts, relationship between short-term use of the environment and long-term productivity, and irreversible and irretrievable commitment of resources are the same as described for Alternative I-1. Cumulative impacts are also the same for this alternative as those described for Alternative I-1.

c. Alternative II

Resource estimates and attendant activities, and oilspill probabilities are the same for this alternative as for Alternative I-1. Therefore, the analyses and conclusions provided for the proposal also apply here.

For the cumulative case for this alternative, the number of oilspills associated with tankering of oil through the St. George Basin planning area from other OCS planning areas would not be significantly different from Alternative I-1. In addition, all other projects and proposals assumed for the cumulative case for Alternative I-1 are also assumed for this alternative. Thus, cumulative impacts for this alternative would be the same as those described for Alternative I-1.

d. Alternative III-1

The area proposed for lease under this alternative does not include waters near Unimak Pass, the Pribilof Islands, the Alaska Peninsula (Unimak Island to Port Moller), and the eastern Aleutian Islands. Thus, the potential for adverse impacts due to noise or oilspills on coastal ecosystems and endangered species, particularly the grey whale, would be reduced from moderate to low with this alternative. Impacts on habitats and resources of special concern (birds and marine mammals) would be reduced from moderate to low.

THE MORE SIGNIFICANT ENVIRONMENTAL CONSEQUENCES

St. George

Resource Category	Level of Expected Impacts* Scheduled Sales Only Under Alternative I-1	Cumulative Impacts of All Activities
1. General Impacts		
a. Coastal Ecosystems	moderate	moderate to high
b. Water Quality and Supply		
Water Quality	low	moderate
Water Supply	low	high
c. Navigation and Shipping	low	low
d. Other Uses of the OCS	n/a	n/a
e. Land Use	low	moderate to high
f. Cultural Resources	low to moderate	low to moderate
2. Impacts of Special Concern		
a. Fish and Commercial Fisheries		
Fish Resources	low	moderate
Commercial Fisheries	low	moderate
b. Endangered Species	moderate	moderate
c. Habitats and Resources of Special Concern	moderate	high
d. Air Quality	very low	low
e. Recreation and Tourism	low	low
f. Socioeconomic Factors	low	low
g. Native Subsistence Cultures	moderate to high	moderate to high

* Definitions of level of impact are provided at the beginning of Section V.D.

Except for those described above, impacts, including cumulative impacts, on resources and activities of the St. George Basin would not be significantly different from those described for Alternative I-1. Sections V.D.14.A.3)-6) contain additional relevant information.

e. Alternative III-2

Resource estimates and attendant activities, and oilspill probabilities are the same for the St. George Basin under this alternative as for Alternative III-1. This being the case, impacts resulting from this alternative would be the same as those described for Alternative III-1. That is, impacts on coastal ecosystems and endangered species would be reduced from moderate to low; impacts on habitats and resources of special concern (birds and marine mammals) would be reduced from moderate to low. Impacts including cumulative impacts, on other resources and activities in the St. George Basin area would be the same as described for Alternative I-1 (and Alternative III-1). Sections V.D.14.a.3)-6) contain additional relevant information.

f. Alternative IV-1.a.

Resource estimates, and attendant activites, and oilspill probabilities are the same for the St. George Basin under this alternative as for Alternative III-1. Delaying Sale 70 in the St. George Basin for three years would give adjacent coastal communities and unorganized boroughs more time to prepare and, perhaps, implement coastal management plans. Delaying the sale would not reduce, but would only delay impacts. Impacts resulting from this alternative would be the same as those described for Alternative III-1. That is, impacts on coastal ecosystems and endangered species would be reduced from moderate to low; impacts on habitats and resources of special concern (birds and marine mammals) would be reduced from moderate to low. Impacts on ther resources and activities, and cumulative impacts on all resources and activities in the St. George Basin area would be the same as described for Alternative I-1 (and Alternative III-1). Likewise, unavoidable adverse impacts would be the same as described for Alternative I-1. The relationship between short-term use of man's environment and long-term productivity for this alternative is the same as that described for Alternative I-1. Sections V.D.14.a.3)-6) also contain relevant information.

g. Alternative IV-1.b

Resource estimates and attendant activities, and oilspill probabilities for the St. George Basin for this alternative as for Alternative IV.-1.a. See the impact analysis for that alternative above (Sec. V.D.14.f).

h. Alternative IV.-2.a.

Resource estimates and attendant activities, and oilspill probabilities for the St. George area are the same for this alternative as for Alternative I-1. This being the case, impacts resulting from this alternative would be the same as those described for Alternative I-1. For the cumulative case for this alternative, the number of oilspills with tankering of oil through the St. George Basin from other OCS planning areas would not be significantly different from Alternative I-1. Dropping the Arctic sales under this alternative would not make a significant difference in the cumulative analysis for this planning

THE MORE SIGNIFICANT ENVIRONMENTAL CONSEQUENCES

St. George

Resource Category	Level of Expected Impacts* Scheduled Sales Only Under Alternative III-1	Cumulative Impacts of All Activities
1. General Impacts		
a. Coastal Ecosystems	low**	moderate to high
b. Water Quality and Supply		
Water Quality	low	moderate
Water Supply	low	high
c. Navigation and Shipping	low	low
d. Other Uses of the OCS	n/a	n/a
e. Land Use	low	moderate to high
f. Cultural Resources	low to moderate	low to moderate
2. Impacts of Special Concern		
a. Fish and Commercial Fisheries		
Fish Resources	low	moderate
Commercial Fisheries	low	moderate
b. Endangered Species	low**	moderate
c. Habitats and Resources of Special Concern	low**	high
d. Air Quality	very low	low
e. Recreation and Tourism	low	low
f. Socioeconomic Factors	low	low
g. Native Subsistence Cultures	moderate to high	moderate to high

* Definitions of level of impact are provided at the beginning of Section V.D.

** Differs from the proposal.

THE MORE SIGNIFICANT ENVIRONMENTAL CONSEQUENCES

St. George

Resource Category	Level of Expected Impacts* Scheduled Sales Only Under Alternative III-2	Cumulative Impacts of All Activities
1. General Impacts		
a. Coastal Ecosystems	low**	moderate to high
b. Water Quality and Supply		
Water Quality	low	moderate
Water Supply	low	high
c. Navigation and Shipping	low	low
d. Other Uses of the OCS	n/a	n/a
e. Land Use	low	moderate to high
f. Cultural Resources	low to moderate	low to moderate
2. Impacts of Special Concern		
a. Fish and Commercial Fisheries		
Fish Resources	low	moderate
Commercial Fisheries	low	moderate
b. Endangered Species	low**	moderate
c. Habitats and Resources of Special Concern	low**	high
d. Air Quality	very low	low
e. Recreation and Tourism	low	low
f. Socioeconomic Factors	low	low
g. Native Subsistence Cultures	moderate to high	moderate to high

* Definitions of level of impact are provided at the beginning of Section V.D.

** Differs from the proposal.

area as cumulative impact factors are not necessarily temporally constrained for the purposes of this analysis. The cumulative impact sections assume that some time on the future the resources will be developed, though not necessarily as a result of the 5-year oil and gas leasing schedule. All other projects and proposals assumed for the cumulative case for Alternative I-1 are also assumed for this alternative. Thus, cumulative impacts for this alternative would be the same as those described for Alternative I-1. Sections V.D.14.a.3)-6) also contain relevant information.

i. Alternative IV-2.b.

See the discussion for Alternative IV.2.a., above.

THE MORE SIGNIFICANT ENVIRONMENTAL CONSEQUENCES

St. George

Resource Category	Level of Expected Impacts* Scheduled Sales Only Under Alternative IV-1	Cumulative Impacts of All Activities
1. General Impacts		
a. Coastal Ecosystems	low**	moderate to high
b. Water Quality and Supply		
Water Quality	low	moderate
Water Supply	low	high
c. Navigation and Shipping	low	low
d. Other Uses of the OCS	n/a	n/a
e. Land Use	low	moderate to high
f. Cultural Resources	low to moderate	low to moderate
2. Impacts of Special Concern		
a. Fish and Commercial Fisheries		
Fish Resources	low	moderate
Commercial Fisheries	low	moderate
b. Endangered Species	low**	moderate
c. Habitats and Resources of Special Concern	low**	high
d. Air Quality	very low	low
e. Recreation and Tourism	low	low
f. Socioeconomic Factors	low	low
g. Native Subsistence Cultures	moderate to high	moderate to high

* Definitions of level of impact are provided at the beginning of Section V.D.

** Differs from the proposal.

15. Navarin Basin

a. Alternative I-1

1) General Impacts

a) Coastal Ecosystems: No land areas are contained within the Navarin Basin planning area. Birds and mammals traverse the area at different times of the year. The closest land areas that could be impacted are St. Lawrence Island to the northeast and St. Matthew Island to the east. The latter represents the Bering Sea National Wildlife Refuge (NWR), but its status may change if there were large-scale development needed because of discoveries in the Navarin or surrounding areas.

For further discussion, see St. Matthew-Hall section under Alternative II.

b) Water Quality and Supply

Water Quality: There is no land within the Navarin Basin. Staging would likely be from the Pribilof Islands or St. Matthew Island. Water quality problems to be expected in these islands would be from construction activities, local in nature and result in increased turbidity, increased runoff, siltation, and diversion of drainage patterns. All impacts except disruption of drainage patterns would be short term.

Offshore water quality in the Navarin Basin is pristine. If the expected commercial quantities of oil and gas occur, 660 million barrels of formation waters will be produced. The projected numbers of oilspills are 2.6 of 1,000 barrels or more and 1.1 spills of 10,000 barrels or greater. Over the years of exploratory and developmental drilling, approximately 16,400 yd^3 of drill cuttings and 79,200 barrels of drilling mud would be discharged. These discharges would cause short-term reductions in water clarity over 0.05 percent of the basin. If formation waters were discharged, they would release the equivalent of 130,000 barrels of oil into basin waters as dissolved hydrocarbons. Overall, petroleum development in the basin would result in slight, chronic oiling of basin waters and loss of water clarity near drilling structures. A major spill is likely to occur and would temporarily degrade water quality in the vicinity of the spill.

Water Supply: Freshwater would have to be supplied by onsite desalination because the distance to land would preclude the use of onshore facilities.

Conclusions. The effects of OCS development in this planning area on water quality will be low, except possibly in the immediate vicinity of platforms. All water supplied would be through desalination so there would be no impacts to developed water supplies.

Cumulative Impacts. In the unlikely event that all potential oil and gas resources of the Navarin Basin planning area are leased and subsequently developed in a timely manner, the expected number oilspills is 5.2 spills of 1,000 barrels or more with 2.2 spills of at least 10,000 barrels. An additional unknown quantity of oilspills is expected to result from tankering from the Canadian Beaufort Sea. Oil industry development of all gas and oil reserves

in the Navarin Basin planning area would result in discharge of 55,yards3 of drill cuttings and 167,400 barrels of drilling mud during drilling phases. Formation waters produced would total 1,400 million barrels over the life of the field. An additional activity that could contribute to cumulative impacts in the planning area is increased foreign fishing activity. This activity could effect water quality through the discharge of fish wastes and the increased risk of fuel spills. The cumulative impacts of these oilspill events, discharges, and additional traffic are expected to produce a low impact to water quality in the planning area.

In the unlikely case that all resources in the planning area are leased and developed, the Navarin Basin planning area in this alternative contributes 25 percent of spills of 1,000 barrels or more and 25 percent of spills of at least 10,000 barrels. The Navarin Basin planning area in this alternative would provide 30 percent of cumulative impact to the planning area from drill cuttings, 24 percent of the impact from drilling mud, and 24 percent of the impact from formation waters. The greatest threat to Navarin Basin water quality is from oil pollution.

The percentage of cumulative impact from oil pollution due to development within the Navarin Basin planning area portion of the alternative is reduced very slightly when tankering from the Canadian Beaufort Sea is considered. The Navarin Basin planning area in this alternative contributes very slightly to the total cumulative impacts in the planning area. The most important factor affecting potential cumulative impacts on water quality is oil pollution from cumulative Federal OCS leasing outside the planning area. The contribution of the Navarin Basin planning area in this alternative to planning area cumulative impacts is insignificant in the case of only the resources described as developed and the case of all resources leased and developed in the planning areas.

c) Navigation: The Navarin Basin is covered by a vast body of water which is only infrequently navigated by commercial vessels. Existing traffic is largely military. The establishment of three production platforms in the confines of the extreme eastern Bering Sea is unlikely to create navigational conflicts. Activities related to support and product transportation are also unlikely to create any significant navigational impacts. Impacts to navigation would be very low.

Conclusion. The probability of impacts to navigation is very low.

Cumulative Impacts. Cumulative impacts are expected to be very low to navigation.

Tankering from other areas and some fishing activity are the major contributors to traffic conflicts in the area. The area is large and conflicts are unlikely. Seven platforms (for total development of the Basin's resources) will not pose a major conflict.

d) Other Uses of the OCS: The main use of this area is commercial fishing. Impacts to these resources are discussed in another section (Section V.D.15.a.2)a)).

e) Land Use: The proposal assumes that St. Matthew Island would house the support/supply facility and that offshore loading would be used for both oil and gas. This support/supply facility will require up to 250 acres. This will substantially alter the land use on the island, which is presently in wilderness status as a national wildlife refuge. Additional support would come out of Unalaska and Cold Bay from already existing facilities. It is expected that a change in use of the 250 acres on St. Matthew Island will meet with regulations and existing plans will be changed. Development of the area will result in moderate impacts outside the area no impacts occur within the area.

Conclusions The level of expected impacts would be moderate outside the planning area. No impacts occur to land use in the area.

Cumulative Impacts Non-OCS projects in the Navarin Basin area are tankering and foreign fishing. These will not affect land use.

For the total development of OCS hydrocarbon resources in the planning area land use impacts will affect 400 acres of land because of the need for a service/supply base and terminal facilities. The result of this development result in severe changes in land use. OCS development is the primary contributor to land use impacts in the region. No land use impacts occur in the planning area as there is no land in the area.

f) Cultural Resources: Impacts to the Navarin cultural resources would be low since most of the area has been submerged for up to 20,000 years before the present. However, the shoreline of 20,000-14,000 B.P. passes through the area. That is the shoreline which is estimated to have existed at the present 90 to 100 meter depth. This area could possibly contain cultural resources and therefore be adversely impacted by exploration and development activities. The Navarin planning unit excludes shorelines. Impacts to St. Matthew Island, the closest shoreline are discussed under the St. Matthew Hall section under Alternative II.

Conclusions No impacts to cultural resources are expected.

Cumulative Impacts. In the unlikely event that all areas of the Navarin planning area are leased and all resources subsequently developed over the life of the proposal, the expected number oilspills is 5.2 spills greater than 1,000 barrels including 2.2 spills greater than 10,000 barrels. An additional project or activity that could contribute to cumulative impacts in the planning area is foreign fishing. These total projects or activities will not appreciably affect cultural resources.

2) Impacts of Special Concern

a) Commercial Fisheries.

(1) Important Fish Resources: The important fishery resources of the Navarin Basin are walleye pollock, Pacific cod, yellow fin sole, flounder, Pacific halibut, Pacific ocean perch, sablefish, tanner crab, Pacific herring, and salmon. Impacts to these resources would result from accidental oilspills and discharge of drilling effluents and wastes.

Over the life of the proposal, 2.6 oilspills greater than 1,000 barrels and 1.1 oilspills greater than 10,000 barrels are expected as a result of all three Navarin sales. Oilspills can impact fish populations by causing short-term acute impacts or long-term sub-lethal impacts. Since most oil remains at or near the surface, species that are most vulnerable are those that inhabit the surface at least sometime during their life cycle. Of the species listed above tanner crab (larvae) and the demersal species (eggs and larvae) would be most susceptable to contact by a surface slick. Since herring and salmon occur in the region in adult form, and because this life stage leads a pelagic existence and are highly mobile, impacts resulting from an oilspill would be very low and possibly non-existent.

Tanner crab could be affected by oil contacting their planktonic larval forms Additionally, oil could sink to the bottom and contact aggregations and adult and juvenile crab or contaminate their habitat and affect their food supply. Given the broad distribution of Tanner Crab in this region and the enormity of the area, even a large oilspill would not be able to contact a significant portion of the population. Therefore, the level of impacts on Tanner crab is expected to be very low.

Several species of demersal (bottom) fish have egg, larval, or juvenile stages that occur at or near the surface. Adult forms on the other hand spend their entire existence at greater depths (100 to 500 meters). Like tanner crab, these species are broadly distributed along the continental shelf and slope. Given their high abundance, broad distribution, and the enormity of the area, the small number of spills expected to occur as a result of the proposal would result in a very insignificant impact on the demersal fish of this region.

Several types of discharges and effluents could be released during OCS oil and gas activities. OCS Operating Orders prohibit disposal of any waste materials into the ocean that will create conditions which will adversely affect aquatic life. Disposal of waste materials is regulated by the Environmental Protection Agency. Of concern, are drilling muds because very little is known about their long-term, chronic impacts. There are indications that these muds could produce elevated trace metal concentrations in marine organisms and interfere with reproductive processes. However, the 18 exploratory and 114 production wells are projected for this alternative would result in the discharge of a relatively small amount of effluent material (Section V.D. 17 a.1)b)) and a small demersal area would be affected (given the large surface area and great depths). Therefore, impacts to fish and shellfish are expected to be very low.

Conclusions This development of oil and gas resources of the Navarin Basin under the proposal is expected to result in very low ecological losses to the fishery resources.

Cumulative Impacts. In the unlikely event that all tracts in the Navarin planning area are leased and developed during the life of the proposal, the expected number of oilspills would be about 5.2 spills greater than 1000 barrels and about 2.2 for spills greater than 10,000 barrels. Additional spills may occur from tankering of crude through the planning area. No additional causative agents or activities can be identified as factors affecting cumulative impacts to the fishery resources.

Given the minor increase in the number of spills in the total development case impacts to fish would still be expected to be very low. The contribution of the proposal (whether the resources are totally developed or not) to the cumulative is 100 percent but the impact in either case is minor.

(2) Commercial Fisheries: The Navarin Basin is comprised of some of the most valuable bottomfish fisheries in the world. Presently this area is being fished by foreign trawlers (primarily Japan, the USSR, and Korea). It is anticipated that the now foreign dominated fishery in this region will be taken over by domestic trawlers by the year 2000. For the purpose of this analysis, a high economic impact on any commercial fishing industry results when there is a ten percent or greater economic loss to that industry. It should be remembered however, that the loss to individual fishermen will be more serious than the loss to industry.

Impacts on commercial fisheries under the proposal would result largely from competition for labor, ocean space use conflicts, and reduced catch due to ecological loss (as discussed above). This analysis (except for reduced catch) draws largely from Tobolski et. al, (1981), which provides an analysis of fishing industry impacts in the Bering Sea.
Over the life of the proposal, about 2.6 oilspills greater than 1,000 barrels and 1.1 oilspills greater than 10,000 barrels are expected to result from Alternative I-1. Since fish resources are expected to sustain very low ecological losses, the commercial fishing industry could sustain low economic losses.

A large oilspill could impact commercial fishing by causing temporary and spatial disruption. It is unlikely that commercial fishermen will harvest in the area of an oilspill because 1) their boats and gear may be contaminated, 2) they may be restricted from the contaminated area while clean-up efforts are underway, and 3) direct coating and incorporation of petroleum hydrocarbons can cause tainting of marine organisms, rendering them undesirable or unmarketable. In the unlikely event that a large oilspill contacted this area during the height of the fishing season (varies by species) a very low impact would result on a given fishery. Since the enormity of the area and the mobility of the fishing vessels, would make it possible for fishing to resume quickly in other areas. Consequently, regional economic impacts would be very low.

A large portion of fishery related labor for the anticipated domestic fishery would be made up of fishermen from outside the region. Therefore, there would not be a willingness of this labor pool to transfer to OCS employment. The impact due to labor competition would be very low to non-existent.

Ocean space use conflicts consist of loss of and damage to fishing gear, loss of access to fishing grounds, and collisions among vessels. Fishing gear conflicts may result from: oil fouling of gear (as stated above), 2) catching or "hanging" gear (trawl nets) on obstructions such as pipelines and bulk material lost overboard during various marine operations, 3) and vessel traffic and seismic operations (trailing long seismic cables) in areas where pot-fishing (crab) and long-line fishing (halibut) occur. Secondary economic impacts from gear conflicts occur from fishing time lost while waiting for repair or replacement of gear. This may be especially acute in these remote areas in Alaska where replacement gear must be shipped from distant suppliers and transportation services are limited.

The analysis for the St. George Basin (Tobolski, 1981) which projected the number of gear damage/loss claims that would be submitted as a result of oil and gas development concluded that there would be 5 claims ($90,000 in 1980 dollars) per year initially, increasing to 12 claims ($216,000 in 1980 dollars) per year during full development. These results were based on the estimated future fishing effort and the projected number of oil and gas installations (platforms) with claim frequencies established for these parameters from North Sea historical data. Given that the intensity of fishing and OCS development is anticipated to be greater in the St. George Basin than in the Navarin Basin the number of claims should be less. Even if the St. George figures are assumed, this would represent a very small economic loss.

The emplacement of 3 platforms in the planning area would result in a loss of access of fishing grounds in the amount of 235.5 hectares (considering a 500 meter buffer radius for the platform). This represents an insignificant loss to the fishing industry.

Attempts by domestic fishermen to exploit the hitherto foreign dominated demersal fish resources will introduce new vessel traffic in the planning area. Similarly, the OCS supply and support vessels will bring additional traffic leading to increased chances of vessel collisions. However, the analysis for the St. George Basin (Tobolski, 1981) concluded that only one collision would be expected in 20 years due to increased OCS vessel traffic. Given that OCS development in the Navarin will not be as heavy as St. George, it is reasonable to assume that one vessel collision would be the upper limit for the life of the proposal for the area. Such a collision may render only slight to moderate damage or even a complete loss (sinking) of one or both of the vessels involved. If the latter is the case, especially for a larger vessel (catcher-processor), the impact to the fishing industry could be moderate considering the 20 year life of the field.

The most likely damage, however, would be much less, because most collisions do not involve sinking or major damage. Statistics of casualties in U.S. waters show that the average value lost per vessel involved in a collision is approximately $22,137 (1980 dollars). If a fishing vessel is involved in a collision during the life of the proposal, then the annual loss equivalent would be $1107. The expected level of impact to the fishing industry, therefore, is very low.

Conclusions As a result of the proposal, the expected level of impact on the commercial fishing industry in the Navarin Basin region is expected to be very low.

Cumulative Impacts. As previously noted, the cumulative impacts on fish resources in the Navarin planning area would be very low. As a result, the economic impact to the fishing inudstry would also be very low. Because full development of the Navarin OCS would not substantially increase OCS activities, other fishing industry impacts (ocean space use conflicts and competition for labor) would not increase significantly over the impacts of the proposal. No other activities or agents can be identified as causing cumulative impacts to the commercial fishery of the Navarin Basin.

The contribution of the proposal (whether total development is considered or not) is major, however, it does not cause significant impacts.

b) Endangered Species: Endangered species that are common or are likely to occur in the Navarin planning area include the bowhead, gray, fin, humpback, and sei whales. Other endangered cetaceans such as the sperm, and right whale are considered rare visitors to this area. No endangered bird species are known to occur in the Navarin Basin. The one endangered species most likely to be affected by oil and gas exploration and development in the Navarin planning area is the bowhead whale. The entire western bowhead whale stock overwinters in the Central Bering primarily in the Navarin Basin while fair numbers of sei, fin, humpback, and gray whales migrate and, or, feed within this planning unit. The potential effects of oil and gas exploration and development on endangered cetaceans would come primarily from oil pollution and noise disturbance.

A definitive assessment of the effects of oil and gas activities in the Navarin on endangered species cannot be made prior to the development of an oilspill trajectory model and oilspill risk analysis, and transportation and development scenarios are formulated in conjunction with the preparation of the EIS for Proposed Sale No. 83. However, because of the importance of this area as the major overwintering habitat of the bowhead whale, endangered species are considered highly sensitive to oil and gas activities in the Navarin planning area. Section V.D.13.a.2)b) contains a discussion of the Section 7 Consultation process, conducted pursuant to the Endangered Species Act of 1973, concerning OCS Leasing and Exploration in the Bering Sea Region. Appendix G, of the FEIS for Proposed OCS Lease Sale No. 57 in the Norton Sound, contains the text of the Biological Opinion received subsequent to that Consultation.

Conclusions Endangered species, particularly the bowhead whale are likely to have some interaction or contact with oilspills and or disturbance during exploration and development. A definitive assessment of the significance of the above interaction cannot be made at this time. However, bowhead whales could be moderately impacted by oil and gas activities in the Navarin planning area under the proposal.

Cumulative Impacts. In the unlikely event that all potential oil and gas resources of the Navarin planning area are leased and all resources subsequently are developed, over the life of the field, the expected number of oilspills is 5.2 spills greater than 1,000 barrels including 2.2 spills greater than 10,000 barrels. An additional unknown quantity of oilspills is expected to result from tankering from Canadian OCS leasing in the Beaufort Sea. An additional project or activity which could contribute to cumulative impacts in the planning area is foreign commercial fishing. The combination of these projects or activities could effect endangered whales through oilspills, disturbance, and commercial harvest of food sources. The cumulative impacts of these oilspill events, projects and activities are expected to produce a moderate to high impact to endangered whales in the Navarin planning area and a very low impact to endangered birds.

In the unlikely case of all resources in the planning area being leased and developed, the alternative contributes 50 percent of spills greater than 1,000 barrels and 50 percent of spills greater than 10,000 barrels. These proportions are reduced somewhat when the tankering from other Federal OCS planning areas (and State lease sale areas to an unknown extent) are considered. Here oilspills from Navarin leasing contribute highly to the total cumulative case. Consequently, the most important causal agent for potential

cumulative impacts on endangered whales are proposed Navarin lease sales. The contribution to cumulative impacts of leasing in the Navarin area under the alternative is major in both the case of total development of the resources in the planning areas, or development of the resources as described under the proposal.

c) Habitats and Resources of Special Concern: A major portion of the Pacific walrus population and sizeable populations of ribbon and bearded seal occur in this planning area. About 1.4 million seabirds, over 60% of which are highly vulnerable to oil pollution, nest off St. Matthew-Hall Islands the nearest landfall east of the Navarin planning area. Habitats of special concern for the above species include marine waters near St. Matthew-Hall Islands, the cliff areas on colony sites on the islands, and the seasonal ice front for overwintering marine mammals. The major adverse impacts of OCS activities from the proposal could come from oil pollution of the marine environment and man-made disturbance.

The species most likely to be affected by OCS oil and gas activities in the Navarin Basin planning area are bearded and ribbon seal pups and diving seabirds. These species of seals' young are born on the ice near the ice front during the spring and are sensitve to oil pollution of their fur causing loss of thermal insulation prior to the development of a fat layer. Seabird populations particularly alcids (murres, auklets, puffins) foraging in offshore areas of the Navarin Basin are likely to suffer some mortalities if an oilspill occurs in this planning area.

Conclusions Marine mammals, seabirds, and their habitats of special concern in the Navarin planning area are expected to be moderately impacted by oil and gas activities discussed under the proposal.

Cumulative Impacts. In the unlikely event that all potential oil and gas resources of the Navarin planning area are leased and all resources subsequently are developed, over the life of the field, the expected number of oilspills is 5.2 spills greater than 1,000 barrels and 2.2 spills greater than 10,000 barrels. An additional unknown quantity of oilspills is expected to result from tankering from Canadian OCS leasing in the Beaufort Sea. An additional project or activity which could contribute to cumulative impacts in the planning area is foreign commercial fishing. The combination of these projects or activities could effect endangered whales through oilspills, disturbance, and commercial harvest of food sources. The cumulative impacts of these oilspill events, projects and activities are expected to produce a moderate to high impact to endangered whales in the Navarin planning area and a very low impact to endangered birds.

In the unlikely case of all resources in the planning area being leased and developed, the alternative contributes 50 percent of spills greater than 1,000 barrels and 50 percent of spills greater than 10,000 barrels. These proportions are reduced somewhat when the tankering from other Federal OCS planning areas (and State lease sale areas to an unknown extent) are considered. Here oilspills from Navarin leasing contributes highly to the total cumulative case. Consequently, the most important causal agent for potential cumulative impacts on endangered whales are proposed Navarin lease sales. The contribution to cumulative impacts of leasing in the Navarin area under the alternative is major in both the case of total development of the

resources in the planning areas or development of the resources as described under the proposal.

d. Air Quality: A discussion of the primary factors used in assessing onshore air quality impacts which may result from OCS-related activities and the method employed in quantifying the impact on this planning area are described in Section V.A.3 of this document.

It is estimated that 18 exploratory wells will be drilled to identify the resources and 114 development/production wells and 3 platforms will be necessary to develop the resources under this alternative. It was assumed, for the purpose of analysis, that production from an average platform would be 6.6 million barrels of oil and 44.1 billion cubic feet of gas per year. The hydrocarbons will be transported to shore via subsea pipelines and to refineries and markets beyond Alaska by tanker. Estimated representative emissions for exploration/development are provided in Table V.D.15.a.2)d)-1. This information is derived from Table V.A.3-1.

Table V.D.14.a.2)d)-1. Estimated Representative Emmisions

Activity	Production at Platform (tons per year)				
	VOC	NO_x	TSP	SO_2	CO
Oil/Gas	43	628	N/A	0.8	238
Barging	None	-	-	-	-

Platforms within 20 miles of the shore would require emission controls; however, the platforms associated with development of the resources described in the proposal are expected to be sited beyond 20 miles from the coast and, therefore, not require controls. No new refineries for the area are projected to result from the proposal, but at least one new gas processing plant may be sited. This facility will not be sited in the planning area.

A very low qualitative impact is expected from routine emissions. The area is in attainment for all pollutants. The onshore gas processing plant would be the only major source of pollutants. Because development will be well offshore, blowouts, oilspills, and fires would likely not impact the onshore air quality unless they lasted for several days.

Any emission sources which would adversely affect the onshore air quality would be subject to mitigation required by EPA and the State, if located onshore, or by DOI, if located on the OCS. ERG (1981) discusses mitigation measures for OCS facilities.

Conclusions. The overall level of expected impacts on air quality is very low.

Cumulative Impacts. It is estimated that a total of 1.1 billion barrels of oil and 7.3 trillion cubic feet of gas exist in the entire Navarin Basin Federal OCS planning area. In the event that total development of all Federal reserves occurs over the life of this proposal, 7 new platforms with 228 wells would be required. It is very unlikely that this magnitude of development will occur over the life of this proposal. The major influencing factors affecting the onshore air quality near the planning area as a result of this development are 1) the number of new wells drilled, 2) the location of the platforms, 3)

the timing of the activities, and 4) instantaneous local meteorological conditions.

The offshore development associated with this proposal contributes moderately to regional cumulative air quality impacts.

No other significant industrial activity is projected for the region over the life of the proposal. Therefore, the proposal plays a summary role in the overall cumulative impacts on air quality in the region. As there are no signficant changes or effects that can be attributed to this activity, the fact it is the primary contributor is not actually an issue.

Overall, cumulative regional air quality impacts are expected to be very low, local impacts will be very low. However, EPA rules associated with the Clean Air Act and the DOI air quality rules have provisions to minimize these impacts.

e. Impacts on Recreation and Tourism: No recreation or tourism occurs in the area. Therefore, no impacts are expected to occur in the planning area as a result of the proposal.

f. Impacts on Socioeconomic Factors: Among all OCS planning areas in Alaska, the Navarin Basin area is second only to the Diapir area in the size of expected finds of both oil and natural gas. The probability of the discovery of commercial petroleum resources in the Navarin area is estimated at 76 percent. Assuming petroleum resources are found in commercial quantities, the amount of oil expected to be discovered as a result of the proposed 5-year leasing program is 570 million barrels, and the corresponding amount of natural gas is 3.67 trillion cubic feet.

Most petroleum workers in the Navarin area would live in isolated dormitories during work periods, and would commute during frequent rest periods to permanent residences in other regions of Alaska or out of state. Most in-state commuters would reside in the Anchorage region. The long-term employment impact resulting from the proposed 5-year leasing program would total about 1,800 additional jobs, and the corresponding population impact would be about 1,600 additional permanent residents of Alaska.

Possible negative impacts in the local area adjacent to the Navarin OCS area could be substantially controlled by the siting of offshore loading facilities or the isolation of petroleum workers in enclaves.

Conslusion. Even with a commercial discovery, most of the impact would be in the form of 1600 additional people to the State, mostly in Anchorage, which could absorb the increase without undue negative effects. Otherwise effects would be very low in the planning area and low to moderate in areas in which enclaves are sited.

Cumulative Impacts. The cumulative oil and gas resource totals, which include discoveries resulting from the 5-year program together with all subsequent discoveries are 1.14 billion barrels of oil and 7.34 trillion cubic feet of natural gas. Cumulative socioeconomic impacts including the effects of Navarin area OCS sales subsequent to the 5-year lesaing program could be as much as 1300 new jobs statewide and 2,600 additional permanent state residents. The

only additional cumulative impacts producing factor in the region is the tankering of oil from northern Alaska and the Canadian Beaufort. This will have no appreciable socioeconomic effect.

g) Impacts on Native Subsistence Cultures: The Navarin Basin planning area is situated so far offshore in the Bering Sea that no villages would be directly affected. Indirect impacts to villages through the Bering Sea and in the Arctic could be realized if OCS activities were to impact the bowhead whale and salmon which migrate through the area (see impacts on endangered species and marine mammals).

Conclusion. There would be no direct impacts on village subsistence cultures from this proposal. The expected level of impacts would be very low.

Cumulaitve Impacts. Potential cumulative impacts are derived primarily from the effects of oil tankering from the northern reaches of Alaska and Canada. Since Native subsistence cultures are not expected to experience direct impacts from either individual lease sales, or from the cumulative effect of multiple lease sales, there should be no direct cumulative impacts on Native subsistence cultures, although indirect impacts could be realized if migrating marine mammals were affected. The expected level of impact would be very low.

3) Impacts on Other Management Plans:

Coastal Zone Management: There is no adjacent land area to this planning area. The closest land is St. Matthew Island, currently in wilderness status as the Bering Sea National Wildlife Refuge.

A coastal resource service area has been formed on the Yukon-Kuskokwim delta between Pastol Bay and Cape Peirce, and a planning effort is underway. Nome should have an approved program by the time of the first Navarin Basin sale, to deal with support activities if based there.

4) Unavoidable Adverse Impacts: Oilspills, discharges of drilling effluents (muds, cuttings, and formation waters) and sewage disposal would result in unavoidable adverse impacts to water quality under the proposal. Impacts from all the above except oilspills could be mitigated by EPA NPDES regulation.

Water supply would be unavoidably adversely affected by this proposal. Limited supplies would be consumed by OCS-related infrastructure and development, creating demands on supplies of unknown quantity.

The unavoidable adverse impact for land use would be a reduction in the amount of land available for other uses. Occupation of land by OCS-related activities and structures would be minimal.

Coastal ecosystems would be unavoidably adversely affected by oilspills and various discharges in a manner similar to that discussed above for water quality. The level of impact would be restricted both geographically and temporally.

The proposal would have unavoidable adverse impacts on fish by oilspills contacting nearshore habitats or eggs and larvae which occur on or near the

surface. Oilspills would also affect commercial fishermen by reducing the number of harvestable fish. These impacts are expected to be minimal.

Birds, marine mammals, and endangered species would also suffer unavoidable adverse impacts from oilspills. The level of impact would depend on when and where the oilspill occurred. Consultation with NMFS and FWS in accordance with the Endangered Species Act of 1973, is required and will be conducted as needed.

Recreation and tourism resources could be adversely effected unavoidably by damage to visual resources and the intrusion of onshore support infrastructure, road systems, nearshore causeways, pipelines and traffic supporting such operations. Such effects would be localized and may serve as an attraction to a segment of the recreation and tourism population.

Cultural resources offshore, such as housepits, burins, scrapers, arrowheads and other artifacts, could be unavoidable destroyed through OCS operations, but the great dynamics of the marine environment already are likely to have caused the destruction of many of these resources. Cultural resources located onshore could be lost or damaged by public pilfering or indiscriminate exposure of artifact sites.

Introduction of urban and industrial land uses, except for regional urban centers, would change the character of isolated, de facto wilderness areas, but impacts would be isolated and small in relation to the total area involved. Where urban centers are involved, land use demands generated by OCS activities could unavoidably produce adverse effects derived from the rate and relative scale of demand. Land speculation and price inflation could be experienced as well as interruptions in community facilities and infrastructure during the period necessary for such aspects of land development to catch up with increased land use demands.

Navtive subsistence cultures could be adversely effected directly in an unavoidable way through accidental oilspills and an increase in population, factors which could effect the access to and availability of subsistence resources. Such impacts have been discussed previously. Perhaps more insidious are the indirect adverse effects which could be caused unavoidably by nature of kinship-based social networks existing between regional centers and villages and the periodicity of urban-village migration customary in village regions. Localized effects in villages could have adverse effects throughout the village region. Disruption of customary urban-village migration patterns, through effects such as urban housing shortages, inflation or reduced supply of public services, could cause hardship for those segments of the population unable or unwilling to adapt to such changes and contribute to social disorder and disorientation of cultural value systems.

5) Relationship Between Local Short-Term and Uses and Maintenance and Enhancement of Long-Term Productivity: The effects of the alternative would vary in kind, intensity, and duration, beginning with preparatory activities (seismic data collection and exploration drilling) or oil and gas development, and ending when natural environmental balances might be restored.

Biological productivity would be lost in the short-term on all onshore lands used in the proposed project. These areas could be returned to productivity in

the long-term with proper management. Restoration may not be entirely feasible; however, the overall loss would be a minor adverse effect. The direct land requirements would show in both the short-term and the long-term because of disturbance. Major construction projects would cause definite changes in both the short-term and long-term.

Short-term oil pollution and the possibility of long-term cumulative oil pollution impacts could cause serious adverse effects on all components of the marine ecosystem, including fisheries. While restoration would allow fisheries production to regain original levels, any reduced annual harvests during the life of the project would be irretrievably lost. The extent is not known presently, but the potential must be recognized.

Freshwater pollution from onshore activities is a short-term effect. The long-term decrease in water quality may be considered to be a tradeoff for obtaining oil and gas resources.

The biota would be threatened in the short-term by potential oil pollution. Direct mortality could be significant through the combined effects of harassment by humans and the increased volume and frequency of noise from vessel traffic or overflying aircraft. In the long-term, such disturbances could alter behavior patterns and could drive fauna away from traditional feeding and breeding grounds or to other critical areas within their range, reducing species populations over a long period of time.

Habitat destruction could cause a reduction in subsistence species which could threaten the regional economy. The improved accessibility to primitive areas from increased construction is a short-term result of this alternative. The overall wilderness value of the coast may decrease form increased land use. Increased human populations in the short-term could change the regional Native culture in the long-term. The subsistence way of life could be modified and population shifts could occur. The overall changes cannot be termed positive or negative, except by those affected.

Archaeologic and historic values discovered during development would enhance long-term knowledge. Overall, finds may help to locate other sites, but destruction of artifacts would represent long-term losses.

Consumption of offshore oil and gas would be a long-term use of non-renewable resources. Economic, political, and social benefits may accrue from the availability of oil and gas. Most benefits would be short-term and would decrease the nation's dependency on oil imports.

The production of oil and gas from the planning area would provide short-term, critically needed energy, and perhaps, provide time either for the development of long-term alternative energy sources or substitutes for existing petroleum sources. Petroleum development in these areas may mean the irreplaceable loss of some fisheries production. the maintenance and enhancement of long-term productivity would depend on efforts to control water quality levels. Regional planning would aid in controlling changing economics and populations, and thus, in moderating any adverse impacts.

6) Irreversible and Irretrievable Commitment of Resources

a) Mineral Reosources: Resources discovered would be irretrievably consumed.

b) Biological Resources: Commercial fishery losses may occur in several ways. For example, fish tissue of any species becomes tainted, there may be a widespread consumer avoidance of all locally harvested fish products, which would affect both fishermen and processors alike. Any losses of commercial fishing incomes attributable to this alternative would be irreverasible and irretrievable. Unharvested commercial finfish and shellfish, as renewable resources, would be irretrievably lost to the economy.

If there is competition for harbor space or employees as a result of leasing, U.S. fishermen may not aggressively exploit the U.S. offshore bottom fishery potentials. Continued harvest of bottomfish by foreigners means irretrieveably lost income to U.S. fishermen and processors.

General industry activities, such as increased ship traffic, aircraft noise, and land based activities, could displace marine birds and mammals into less favorable environments, which would eventually result in reduced population levels. This displacement could become irretrievable if permanent alterations to the environment and habitat were maintained by man.

c) Endangered Species: Under the Alternative, it is possible that endangered whales could be subjected to irreversible direct and indirect effects of oilspills, disturbance due to noise and other human activities, or losses or deterioration of habitat due to facility developments. Whether such effects would lead to permanent (irreversible losses of whale resources is unknown.

b. Alternative I-2

Resource estimates and attendant activities, and oilspill probabilities are the same in the Navarin Basin for this alternative as for Alternative I-1. This being the case, impacts resulting from this alternative would be the same as those described for Alternative I-1. In addition, impacts on other management plans and unavoidable adverse impacts would be the same as described for Alternative I-I. The relationship between short-term use of man's environment and long-term producitivity for this alternative is the same as described for Alternative I-1. The irreversible and irretrievable commitment of resources associated with this alternative is the same as described for Alternative I-1.

For the cumulative case, all othe projects and proposals assumed for Alternative I-1 are also assumed for this alternative. Thus, cumulative impacts for this alternative would be the same as described for Alternative I-1.

c. Alternative II

Resource estimates and attendant activities, and oilspill probabilities are less for this alternative than for Alternative I-1. Sixty-eight exploration and development wells are associated with Alternative II (vs. 132 under the proposal), 2 platforms (vs. 3 for the proposal), 1.3 spills greater than 1,000 bbl and 0.6 greater than 10,000 bbl (vs. 2.6 and 1.1, respectively, for the proposal. Impacts resulting from this alternative are expected to be

THE MORE SIGNIFICANT ENVIRONMENTAL CONSEQUENCES

Navarin

Resource Category	Level of Expected Impacts* Scheduled Sales Only Under Alternative I-1	Cumulative Impacts of All Activities
1. General Impacts		
a. Coastal Ecosystems	very low	low to moderate
b. Water Quality and Supply		
Water Quality	low	low
Water Supply	none	none
c. Navigation and Shipping	very low	very low
d. Other Uses of the OCS	n/a	n/a
e. Land Use	none	none
f. Cultural Resources	none	none
2. Impacts of Special Concern		
a. Fish and Commercial Fisheries		
Fish Resources	very low	very low
Commercial Fisheries	very low	very low
b. Endangered Species		
Cetaceans	moderate	moderate to high
Birds	very low	very low
c. Habitats and Resources of Special Concern		
Birds	moderate	moderate to high
Mammals	moderate	moderate to high
d. Air Quality	very low	very low
e. Recreation and Tourism	very low	very low
f. Socioeconomic Factors	very low	very low
g. Native Subsistence Cultures	very low	very low

* Definitions of level of impact are provided at the beginning of Section V.D.

(This table also applies to Alternatives I-2, II, III-1, III-2, IV-1, and IV-2. See text.)

significantly different from those described for Alternative I-1 though they will be lower. In addition, impacts on other management plans and unavoidable adverse impacts would be the same as described for Alternative I-1. The relationship between short-term use of man's environment and long-term productivity for this alternative is the same as described for Alternative I-1. The irreversible and irretrievable commitment of resources associated with this alternative is the same as described for Alternative I-1.

For the cumulative case, all othe projects and proposals assumed for Alternative I-1 are also assumed for this alternative. Thus, cumulative impacts for this alternative would be the same as described for Alternative I-1.

d. Alternative III-1.

Resource estimates and attendant activities, and oilspill probabilities are less for this alternative than for Alternative I-1. Fifty-five exploration and development/production wells are expected to result from the adoption of this alternative in the planning area (vs. 132 for the proposal), 2 platforms (vs. 3) and 1.0 oilspills greater than 1,000 bbl and 0.4 greater than 10,000 bbl (vs. 2.6 and 1.1, respectively, for the proposal). Impacts resulting from this alternative are not expected to be significantly different from those described for Alternative I-1, although they will be slightly lower. In addition, impacts on other management plans and unavoidable adverse impacts would be the same as described for Alternative I-1. The relationship between short-term use of man's environment and long-term productivity for this alternative is the same as described for Alternative I-1. The irreversible and irretrievable commitment of resources associated with this alternative is the same as described for Alternative I-1.

For the cumulative case, all other projects and proposals assumed for Alternative I-1 are also assumed for this alternative. Thus, cumulative impacts for this alternative would be the same as described for Alternative I-1.

e. Alternative III-2.

Resource estimates and attendant activities, and oilspill probabilities are less for this alternative than for Alternative I-1. Sixty-seven exploration and development/production wells are expected in the area with the adoption of this alternative (vs. 132 for the proposal) 2 platforms (vs. 3), 1.3 spills greater than 1,000 bbl and 0.5 greater than 10,000 bbl (vs. 2.6 and 1.1, respectively, for the proposal). Impacts resulting from this alternative are expected to be significantly different from those described for Alternative I-1 although they will be slightly lower. In addition, impacts on other management plans and unavoidable adverse impacts would be the same as described for Alternative I-1. The relationship between short-term use of man's environment and long-term productivity for this alternative is the same as described for Alternative I-1. The irreversible and irretrievable commitment of resources associated with this alternative is the same as described for Alternative I-1.

For the cumulative case, all othe projects and proposals assumed for Alternative I-1 are also assumed for this alternative. Thus, cumulative

impacts for this alternative would be the same as described for Alternative I-1.

f. Alternative IV-1.a.

The resource estimates, infrastructure and expected oilspills in the planning area associated with the adoption of this alternative is identical to Alternative II. See Alternative II for discussion.

g. Alternative IV-1.b.

See Alternative IV-1.a and Alternative II discussions.

h. Alternative IV-2.a.

Resource estimates and attendant activities, and oilspill probabilities are the same in the Navarin Basin for this alternative as for Alternative I-1. This being the case, impacts resulting from this alternative would be the same as those described for Alternative I-1. In addition, impacts on other management plans and unavoidable adverse impacts would be the same as described for Alternative I-I. The relationship between short-term use of man's environment and long-term productivity for this alternative is the same as described for Alternative I-1. The irreversible and irretrievable commitment of resources associated with this alternative is the same as described for Alternative I-1.

For the cumulative case, all othe projects and proposals assumed for Alternative I-1 are also assumed for this alternative. Thus, cumulative impacts for this alternative would be the same as described for Alternative I-1.

i. Alternative IV-2.b.

See discussion for Alternative IV-2.a. Impacts are as described in the proposal.

16 St. Matthew-Hall

a. Alternative I-1: The St. Matthew-Hall planning area is not included in the proposal. Impacts resulting from activity in adjacent planning areas as a result of the proposal are included in the discussions of cumulative impacts for individual resource categories under Alternative II, Section V.D.20.c.

b. Alternative I-2: No sales are scheduled in St. Matthew-Hall area under this alternative. Therefore, no direct impacts result from activity within the planning area.

c. Alternative II

1) General Impacts

a) Coastal Ecosystems: The St. Matthew-Hall planning area encompasses or is adjacent to large areas of sensitive wildlife habitat that may be adversely impacted by oil and gas development. The Yukon River Delta is the largest and most productive of western Alaskan waterfowl habitats. Nearly the entire population of emperor and cackling geese nest on the Delta, as do most of the Pacific Flyway whistling swans. A portion of the primary coastal habitat for those species is in the Clarence Rhode National Wildlife Refuge. Other designated wildlife refuges and ranges in the proposed lease area include Cape Newenham and the Walrus Islands, Nunivak Island, and Hazen Bay. Coastal ecosystem impacts would be very low, as their is little chance of that and gas resources occur in this area.

Conclusions. The level of impact to coastal ecosystems is expected to be very low.

Cumulative Impacts. Since no development is expected for the St. Matthew-Hall planning area, cumulative impacts would be produced only by activities outside the planning area. These would include the tankering of oil produced on Federal leases in the Barrow Arch. Hope, and Norton planning areas, the State of Alaska leases and the proposed Calista leases on the Yukon River Delta and Canadian Beaufort Crude. Tankers transiting this planning area would increase the oilspill risk from essentially none to an unknown amount over the next 25 to 35 years. These activities (tankering) are expected to produce a low to moderate cumulative impact on the coastal ecosystems in this planning area.

b) Water Quality and Supply:

Water Quality: The St. Matthew-Hall area's water quality is considered to be prestine. Only exploratory activities are anticipated in this region, and no oil industry construction is likely to occur. Therefore, there will be no impact on onshore water quality.

Offshore water quality in the St. Matthew-Hall Basin is pristine. No oil or gas is expected to be found in this basin, therefore, the only impacts under this alternative would be from exploratory drilling. During the years of exploratory drilling, approximately 1,500 cubic yards of drill cuttings and 17,250 barrels of drilling mud would be discharged to basin waters. These discharges would cause short-term degradation of water clarity over 0.008

THE MORE SIGNIFICANT ENVIRONMENTAL CONSEQUENCES

St. Matthew-Hall

Resource Category	Level of Expected Impacts* Scheduled Sales Only Under Alternative I-1	Cumulative Impacts of All Activities
1. General Impacts		
a. Coastal Ecosystems	n/a	low to moderate
b. Water Quality and Supply		
Water Quality	n/a	very low
Water Supply	n/a	very low
c. Navigation and Shipping	n/a	very low
d. Other Uses of the OCS	n/a	n/a
e. Land Use	n/a	moderate
f. Cultural Resources	n/a	moderate
2. Impacts of Special Concern		
a. Fish and Commercial Fisheries		
Fish Resources	n/a	moderate
Commercial Fisheries	n/a	low
b. Endangered Species		
Cetaceans	n/a	low
Birds	n/a	very low
c. Habitats and Resources of Special Concern	n/a	low to moderate
d. Air Quality	n/a	very low
e. Recreation and Tourism	n/a	very low
f. Socioeconomic Factors	n/a	very low
g. Native Subsistence Cultures	n/a	high to very high

* Definitions of level of impact are provided at the beginning of Section V.D.

(This table also applies to Alternatives I-2, III-1, III-2, IV-1 and IV-2. See text.)

percent of the planning unit. This represents a very low impact to the offshore water quality in the area.

Water Supply: Water supply systems in St. Matthew-Hall area are unlikely to be able to meet even the relatively minimal requirements of oil industry. Because of the distances involved and low likelihood of discovery, industry will probably use self-contained exploratory units with their own water supply. As a result, there will be very low impacts to the water supply in the St. Matthew-Hall area.

Conclusions. There are no expected impacts to onshore water quality. Offshore impacts would be slight, very local, short-term decreases in water clarity in the immediate vicinity of drilling platforms. Overall, the level of expected impacts to water quality is very low. Industry will likely use a self-contained drilling platform with its own freshwater supply during exploratory drilling. Overall, very low impacts occur to water supply.

Cumulative Impacts. No commercial quanitites of oil and gas resources are expected to be found in the St. Mathew-Hall planning area. Therefore, no spills are expected from exploration, production or development. An unknown quantity of oil spills is expected to result from tankering from Federal OCS lease sales in Norton Basin, Hope Basin, and Barrow Arch planning areas. An additional unknown number of oilspills could occur from development of State of Alaska onshore and offshore reserves in Hope Basin (sale 45) and Norton Basin (sale 38) areas, from development of Native Corporation onshore reserves near the Barrow Arch and North Aleutian areas, and from tankering of Canadian Beaufort Sea crude. Oil industry exploration for gas and oil in the St. Mathew-Hall planning area would result in discharge of 1,500 cubic yards of drill cuttings and 17,250 barrels of drilling mud. No formation waters would be produced. Increased commercial traffic and fisheries development could contribute to cumulative impacts in the planning area by increasing risk of fuel spills and discharge of fish waste. The cumulative impacts of these oil-spill events, discharges, and additional traffic are expected to produce a moderate impact to water quality in the planning area. The St. Mathew-Hall planning area in this alternative would provide 100 percent of cumulative impact to the planning area from drill cuttings and 100 percent of the impact from drilling mud. However,the greatest threat to St. Matthew-Hall water quality is still from oil pollution.

The primary sources of oil pollution within the St. Matthew-Hall planning area portion of the alternative is tankering from other federal OCS planning areas, state and Native Corporation proposed leases and Canada which will transit the St. Matthew-Hall planning area. The proposal is not expected to contribute significantly to cumulative impacts in the planning area.

No significant projects, proposals or activities are anticipated in the area over the life of the proposal. Very low cumulative impacts to water supply may occur in the planning area. The proposed schedule will not contribute to these impacts as the exploration facilities will be self continued.

c) Navigation: See discussion under Alternative I-1, Navarin Basin.

Conclusions. Impacts on navigation are expected to be very low.

Cumulative Impacts. Traffic in the St. Matthew-Hall region will in the future be comprised largely of tankering and related hydrocarbon support traffic, as well as general commercial freight and fishing vessels. As no commercially recoverable resources are forecast for the St. Matthew-Hall Basin, it is unlikely that any OCS-related activities will persist past the exploratory period. As this is the case, OCS impacts from this planning unit in both the cumulative and mean resource cases can be expected to be very low.

d) Other Uses of the OCS: There are no major users of this area aside from fishing and tankering. Impacts from and to these activities are discussed in the appropriate sections.

e) Land Use: No land use impacts are expected to occur by the planning as a result of the exploratory activity. However, St. Matthew Island is expected to be used as a staging area for development of the hydrocarbon resources in the Navarin Basin. This will cause low level impacts in the planning area.

Conclusions: No impacts on land use are expected to occur from the implementation of the proposal in St. Matthew-Hall planning area. However, the Navarin development will cause moderate impacts.

Cumulative Impacts. Cumulative impacts on land use are expected to be moderate. Development of resources in the Navarin Basin will rely on a support base on St. Matthew Island and cause a major change in use, from national wilderness to industrial. The cumulative impacts on land use are moderate. This is caused by implementation of the proposal overall. Only staging activities will be cited on the Island.

f) Cultural Resources: St. Matthew Island is an area of moderate probability of early habitation by humans. The shelf around the Island could be an area of high probability of human habitation. Any artifacts which may remain in the shelf near St. Matthew Island could be subjected to adverse impacts from oil exploration and development. However, the likelihood of such impacts are low. Surveys done on the island have revealed baleen and log that could be human evidence of prehistoric occupation.

The Navarin Basin contribution to impacts on St. Matthew Island would result from potential oilspills or facilities siting. Oilspill risk is low from Navarin Basin.

Conclusions. The expected impacts on cultural resource sites onshore is low.

Cumulative Impacts. Cumulative impacts on cultural resources are expected to be moderate wholly as a result of activities occurring in or in support of, exploration, production, and development in the Navarin Basin.

2) Special Concern

a) Commercial Fisheries

(1) Commercial and Subsistance Fish

Resources: The important commercial fishery resources of the St. Matthew Hall region include all five species of Pacific salmon, king and Tanner crab,

Pacific herring, halibut and several species or groups of bottomfish (blackcod, walleye pollock, Pacific cod, Yellow fin sole, and flounder). Of special concern is the highly productive run of salmon into both Kuskokwim Bay and the southern portion of the Yukon River Delta, and the herring spawning areas of Goodnews Bay, Security Cove, Nelson Island and Cape Romanzof. Subsistance fisheries tend to rely more heavily on salmon, and to a lesser degree on crab and other shellfish. Impacts to these resources would result from accidental oilspills and discharge of drilling effluents and wastes.

Because no oil and gas resources are expected in this planning area, no oilspills are expected to result from Alternative II St. Matthew Hall sales. For the sake of this analysis however, oil resources are assumed to be present, and are subject to development, in this planning area. Oilspills can impact fish populations by causing short-term acute impacts or long-term sublethal impacts. Since most oil remains at or near the surface, species that are most vulnerable are those that inhabit the surface layer or shallow nearshore at least some time during their life cycle. These species include salmon (adult and juvenile of all five species, and egg and larvae of pink and chum salmon), herring (all life stages), crab (larvae of all species), and several species of demersal fish (eggs and larvae).

Salmon: Adult salmon (primarily sockeye, chinook, and coho) would be vulnerable to oil contamination if a spill contacted areas in or near the mouths of rivers during or preceeding periods when these fish are congregating near these river mouths prior to migrating up river to spawn. Smolt would be susceptable to adverse impacts in the same areas during out-migration or in nearshore areas during their first few months in the marine environment. Pink and chum salmon are low in abundance in the Kuskokwim Bay area and therefore would not be as vulnerable. Vulnerability to any of the five species would vary depending on the timing of the spawning or out-migration of a particular population or run. For all five species in this planning area the period of vulnerability ranges from June to August for juveniles (smolt) and adults and May to July for egg and larval pink and chum salmon.

If it is assumed that if an oilspill contacts a nearshore area, especially off the mouth of a salmon stream, several impacts could occur. These impacts could be any of a variety of lethal or sublethal toxic responses, or the loss of fish prey organisms. Adult salmon are highly mobile, and some evidence suggests that this life stage could detect and avoid toxic levels of aromatic hydrocarbons in solution (Weber et. al., 1981). Therefore, the major concern seems to be that these adults would avoid areas of contamination, which if found off the mouths of major spawning rivers could result in delays in spawning runs or actual blockage of the river or stream. Given the fact that oilspills in the marine environment generally result in concentrations less than those which have proven toxic to adult salmon (Malins, 1977), it is quite unlikely that this type of impact would occur. Even if toxic concentrations did occur, these concentrations would not remain long in marine waters, especially off the mouth of major rivers such as the Yukon and Kuskokwim where dilution would occur rapidly.

Salmon smolt on the other hand would perhaps be more vulnerable, in that they would remain in nearshore waters for longer periods while they feed and grow in preparation of movements farther offshore. However, like adult salmon juveniles appear to possess the ability to detect toxic concentrations of

petroleum hydrocarbons (Maynard et al., 1981). If this is the case, then oilspills in the nearshore could possibly be avoided to some degree by this life stage. Additionally, as stated above, toxic concentrations in the range of concern (5-15 parts per million [Maynard et al., 1981] of aromatic hydrocarbons) would not be expected in marine waters. However, considering that a spill could remain several days or several weeks in coastal waters, portions of a population may be subject to prolonged stress from sublethal effects.

The eggs and larvae of pink and chum salmon that occur in marine intertidal areas would be the most vulnerable of these earlier life stages. It would be difficult to quantify the impacts to a local salmon fishery from oilspill contamination in a spawning or larval rearing area. However, it is possible that a large portion of eggs and larvae could be lost. The gravity of this loss, however, becomes somewhat obscure when one considers that natural mortality of eggs and larvae may be as high as 75 percent for each of these life stages. The difficulty would be in ascertaining what percentage of those lost from oil pollution would have succumbed naturally. It is possible that most of a year class from a local population could be lost. When considering the large annual fluctuations in these species, however, this may not always be significant. Generally, loss of a year class is not a desirable effect. It can significantly reduce later year population levels.

Given the extremely low number of expected spills, and the narrow periods of vulnerability at least for adult and juvenile salmon, it is unlikely that an oilspill would contact important nearshore areas during the period when salmon are present. The level of impact to a local pink or chum population could be high as a result of oil contacting an important spawning and larval rearing intertidal area.

Shellfish: Two species of crab (Tanner, and king) have similar life histories in that adults spend the winter months in deep water (150-400 m) and migrate to shallow (6-20 m) waters in the spring and summer to spawn. During this period, the eggs which have been carried by the female since the previous spawning period hatch and become free swimming planktonic larvae.

Distribution of these most sensitive larval forms is generally widespread, and therefore, would be the most susceptible to contact by an oilspill. The likliehood of such an interaction then is high at least once during the life of the field. Even in the case of a very large spill (10,000 barrels or greater) in this region, only a small insignificant percentage of crab larvae would be contacted by concentrations of oil (1-10 ppm) that would cause mortality. The level of impact on crab larvae is then expected to be low for regional populations.

Another effect on crab populations may result from oil sinking to the bottom and contacting aggregations of adult or juvenile crab or by contaminating large areas and affecting their food supply. There is greater opportunity for this phenomenon in more shallow, nearshore waters where adult and juvenile crab spend lengthy periods. The liklihood of such an event is somewhat less than contact to the larval stages given the broad distribution of crab populations. It is likely that contact with adult and juvenile crab are less vulnerable than larval stages. The level of impact to these life stages (adult and juvenile)

on a regional basis is low. Local crab populations in nearshore waters could, however, suffer at least one short-term decline if their habitat is affected.

Herring: Herring are most vulnerable from oilspills as spawning adults, eggs, and larvae, in that these life stages occur almost exclusivly in nearshore waters. In May and June herring of this region move into the nearshore areas of Western Alaska to deposit their eggs on vegetation (kelp and eelgrass) or rocky substrate. Eggs hatch within a month and larvae spend about two months in nearshore waters prior to changing into juveniles and moving offshore.

Because no spills are expected in the important spawning areas (Goodnews Bay, Security Cove, Cape Romanzof, and Nelson Island), it is very unlikely that herring would be contracted by an oilspill under this alternative.

If an oilspill did contact one of the spawning areas during the spawning or larval rearing period, it is possible that adverse consequences to the local herring population could occur. These consequences could include egg or larval mortalities, contamination of spawning substrate, loss of organisms upon which larval herring feed, and adult mortalities. It is possible that a year class from the impacted area could be lost as a result of this impact. The extent of these losses would depend on many factors, with the size of spill and size of the affected area being the greatest determinants. It is also possible that only a portion of the spawning population, eggs, or larval herring would be affected in a given area. Given that extreme environmental conditions (i.e., shortage of food supply, storms, etc.) cause extremely high egg and larval mortality (as high as 99 percent for larvae and 60 to 90 percent for eggs (Smith, 1976)), the loss attributable to an oilspill could be extremely small. However, the loss of a local year class would not be expected. The expected level of impact to the regional herring biomass would be low.

Demersal Fish: Demersal species including halibut would probably be less affected by an oilspill than any other species group. The most vulnerable species are those which have egg or larval forms that inhabit surface or nearshore surface waters. Important species in the St. Matthew region which display this characteristic are halibut, yellow fin sole, flounder, and pollock. Because fish eggs and larvae are relatively sensitive to hydrocarbon contact, and because of the broad distribution of these life stages throughout the region it is likely that an oilspill would result in a low ecological loss to these species. The level of impact on a regional basis, would be low.

Several types of discharges and effluents could be released during OCS oil and gas activities. OCS operating orders prohibit disposal of any waste materials into the ocean that will create conditions which will adversely affect aquatic life. Disposal of waste materials is regulated by the Environmental Protection Agency. The discharge of drilling muds is of concern because little is known about their long-term, chronic impacts (See Appendix 8 of the FEIS). There are indications that these muds could produce elevated trace metal concentrations in marine organisms and interfere with reproductive processes. However, given that only 5 exploratory wells are projected for this alternative, a relatively small amount of effluent material would be discharged, (Section V.D.16.c.1)b) and consequently, only a small amount of bottom area would be affected. Therefore, impacts to fish and shellfish are expected to be very low.

Conclusion. Overall, regional impacts to fish and shellfish would be very low.

Cumulative Impacts. Because no oil and gas resources are expected to be discovered as a result of exploration in the St. Matthew Hall planning area, no development would follow. Cumulative oilspill impacts would then result from tankering of oil from proposed Federal and State leases (Hope Basin, Norton Basin, Barrow Arch) and from the Canadian Beaufort crude transiting the area. Some, but it is not known how many, number of spills will result over the life of the proposal.

Fish populations are also stressed by commercial fishing pressure which combined with the cumulative oilspill impact could result in a ecological loss to certain species (primarily herring) unless management action (i.e., area closures) is taken to relieve the harvest pressure. Overall, the expected regional impacts on fish populations due to the cumulative impacts is moderate.

There would be no contribution of this alternative from activity within the planning area to the cumulative case, because no oil resources are expected to be discovered.

(2) Commercial Fisheries: The St. Matthew-Hall region is a valuable commercial fishing area for both salmon and herring. In 1979, over 10 million pounds of fish worth over $6 million to commercial fisherman were landed in this region (Terry et al., 1981). This represents about one percent of the total Alaska landings. For the purpose of this analysis, a high economic impact on any commercial fishing industry results when there is a ten percent or greater economic loss to that industry. A moderate economic impact results when there is an economic loss of less than ten percent. A low economic loss results when there is a small economic loss to the industry (See section VD for a more complete definition of high medium and low levels of impact. It should be recognized however, that the loss to individual fishermen probably will be more serious than the loss to industry.

Impacts on commercial fisheries under the proposal would result largely from competition for labor, ocean space use conflicts, competition for infrastructure services, and reduced catch due to ecological loss (as discussed [illegible]). This analysis (except for reduced catch) draws largely from Tobolski et al, (1981), which provides an analysis of fishing industry impacts in the Bering Sea.

Since fish resources are not expected to sustain an ecological loss (see discussions in Section V.D.16.c.2)a)(1)), the commercial fishing industry would sustain no economic losses because there would be no loss in potential catch.

If a large oilspill did occur, however, it could result in impacts to the commercial fishing industry by causing a disruption in space and time. It is unlikely that commercial fisherman will harvest in the area of an oilspill because 1) their boats and gear may be contaminated, 2) they may be restricted from the contaminated area while clean-up efforts are underway, and 3) direct coating and incorporation of petroleum hydrocarbons can cause tainting of marine organisms, rendering them undesirable or unmarketable. This disruption in fishing would affect the nearshore salmon and herring fisheries to a greater degree than the offshore demersal fish fisheries. In the unlikely event that a large oilspill contacted this area during the height of the fishing season (varies by species) a moderate impact would result on the local fishery

(especially on the herring fishery). Regional economic impacts, however, would be low.

A large portion of fishery related labor in the region of interest is made up of fishermen whose earnings are lower than may be paid to unskilled workers in the oil and gas industry. This is likely to lead to a willingness of some part of this labor pool to transfer to OCS related employment. However, because the number of jobs to which they would be attracted is limited the impact due to labor competition would be very low.

Ocean space use conflicts consist of loss of and damage to fishing gear, loss of access to fishing grounds, and collisions among vessels. Fishing gear conflicts may result from: 1) oil fouling of gear (as stated above), 2) catching or "hanging" gear (trawl nets) on obstructions such as pipelines and bulk material inadvertantly lost overboard during various marine operations, 3) and vessel traffic and seismic operations (trailing long seismic cables) in areas where pot-fishing (crab) occur. Secondary economic impacts from gear conflicts occur from fishing time lost while waiting for repair or replacement of gear. This may be especially acute in these remote areas in Alaska where replacement gear must be shipped from distant suppliers and transportation services are limited.

The analysis for the St. George Basin (Tobolski, 1981) which projected the number of gear damage/loss claims that would be submitted as a result of oil and gas development concluded that there would be 5 claims ($90,000 in 1980 dollars) per year initially, increasing to 12 claims ($216,000 in 1980 dollars) per year during full development. These results were based on the estimated future fishing effort and the projected number of oil and gas installations (platforms) with claim frequencies established for these parameters from North Sea historical data. Given that the intensity of fishing and OCS development is anticipated to be much greater in the St. George Basin than in the St. Matthew-Hall region the number of claims should be much less. Even if the St. George figures are assumed, this would represent a total economic loss of less than 0.3 percent to the regional fishermen. However, this could represent a very high loss to individual fishermen.

Attempts by domestic fishermen to exploit the hitherto foreign dominated demersal fish resources will introduce new vessel traffic in the planning area. Similarly, the OCS supply and support vessels will bring additional traffic leading to increased chances of vessel collisions. However, the analysis for the St. George Basin (Tabolski, 1981) concluded that only one collision would be expected in 20 years due to increased OCS vessel traffic. Given that OCS development in the St. Matthew-Hall will not be as heavy as St. George, it is reasonable to assume that one vessel collision would be the upper limit for the life of the proposal for the Gulf of Alaska. Such a collision may render slight to moderate damage or even a complete loss (sinking) of one or both of the vessels involved. If the latter is the case, especially for a larger vessel (catcher-processor), the impact to the fishing industry could be moderate considering the 20 year life of the field.

The most likely damage, however, would be much less, because most collisions do not involve sinking or major damage. Statistics of casualties in U.S. waters show that the average value lost per vessel involved in a collision is approximately $22,137 (1980 dollars). If a fishing vessel is involved in a

collision during the life of the proposal, then the annual loss equivalent would be $1,107. The expected level of impact to the fishing industry, therefore, is very low.

Impacts resulting from competition for infrastructure services would not be expected because no discovery of resources is expected.

Conclusion. As a result of the proposal the expected level of impact on the commercial fishing industry in the St. Matthew-Hall region is expected to be very low.

Cumulative Impacts. As previously noted the cumulative impacts on fish resources (salmon and herring) in this region, would be moderate. This would result from the number of expected spills that result from the tankering of oil from proposed Federal and State lease sales in other planning areas and OCS activiteis in the Canadian Bueaufort. As a result of this moderate loss to fish resources the fishing industry would be expected to sustain a low economic loss.

Because full development of the St. Matthew-Hall OCS would not be expected, other fishing industry impacts (i.e. competition for infrastructure services, ocean space use conflicts, and competition for labor) would not be significant.

The level of impact to the fishing industry from cumulative impacts would be low.

There would be no contribution of this alternative to the cumulative case, because no oil resources are expected to be discovered.

b. Impacts on Endangered Species: There are eight endangered whale species which occur or may occur on occasion within the St. Matthew-Hall planning area. They include the gray, humpback, fin, sei, blue, sperm, right, and bowhead whales. An endangered bird species, the peregrine falcon, may occur on St. Matthew-Hall Islands or along the coast of the Yukon-Kuskokwim Delta during migration. The endangered species most likely to be affected by oil and gas activities in this planning area proposed under this alternative are the gray, bowhead, fin, humpback, and sei whales. Other endangered species including the peregrine are considered uncommon or rare visitors to the area and are very unlikely to be significantly affected. No definitive assessment of the affects of oil and gas activities in St. Matthew-Hall planning area can be made at this time. However, this part of the Bering Sea represents important overwintering habitat of the bowhead whale, and feeding, and/or migration area for gray, fin, humpback, and sei whales. Therefore, endangered species are considered moderately sensitive to oil and gas activities in the St. Matthew-Hall planning area.

Section V.D.13a.2)b) contains a discussion of the Section 7 Consultation process, conducted pursuant to the Enadangered Species Act of 1973, concerning OCS Leasing and Exploration in the Bering Sea Region. Appendix G, of the FEIS for Proposed OCS Lease Sale No. 57 in the Norton Sound, contains the text of the Biological Opininion received subsequent to that Consultation.

Conclusions. Endangered whales would come into contact with OCS development activities, but impacts would be low because of the small amount of activity expected. Impact would be very low for endangered birds.

Cumulative Impact. In the unlikely event that all potential oil and gas resources of the St. Matthew-Hall planning area are leased and all resources subsequently are developed over the life of the field, it is expected that there will be no oilspills greater than 1,000 barrels. An unknown quantity of oilspills is expected to result from tankering from Federal and Canadian OCS lease sale in the Bering and Arctic planning areas. An additional unknown number of oil spills could occur from development of State of Alaska territorial waters in Norton Sound and Hope. An additional activity could contribute to cumulative impacts in the planning area is commercial traffic. These projects or activities could effect both endangered birds and whales in the following ways: oil spills, disturbance, and changes in habitat. The cumulative impacts of these oil spill events, projects and activities are likely to produce a low impact on endangered whales and a moderate impact on endangered birds in the St. Matthew-Hall planning area.

In the unlikely case of all resources in the planning area leased and developed, the alternative contributes no spills greater that 1,000 barrels. Disturbance effects of leasing in the area contributes moderately to the total cumulative case. The most important causal agent for potential cumulative impacts on endangered whales and birds is tankering from other Federal and Canadian lease sales. The contribution of the alternative to cumulative impacts is moderate in the case of only the resources described as developed or all resources leased and developed in the planning areas.

c) Habitats and Resources of Special Concern: See discussion under Alternative I-1 for Navarin Basin.

Conclusions. Impacts to coastal resources and habitats will be low.

Cumulative Impacts. In the unlikely event that all potential oil and gas resources of the St. Matthew-Hall planning area are leased and all resources subsequently are developed over the life of the field, it is expected that there will be no oilspills greater than 1,000 barrels. An unknown quantity of oilspills is expected to result from tankering from Federal OCS lease sale in the Barrow Arch Hope and Norton planning areas. An additional unknown number of oil spills would occur from development of State of Alaska territorial waters in Norton Sound and Hope. An additional activity which would contribute to cumulative impacts in the planning area is commercial traffic. These projects or activities would effect both birds and marine mammals in the following ways: oil spills, disturbance, and changes in habitat. The cumulative impacts of these oil spill events, projects and activities are likely to produce a moderate impact on birds and as well as on marine mammals in the St. Matthew-Hall planning area.

In the unlikely case of all resources in the planning area leased and developed, the alternative contributes no spills greater that 1,000 barrels. Disturbance effects of leasing in the area contributes moderately to the total cumulative case. The most important causal agent for potential cumulative impacts on birds and marine mammals is tankering from other Federal lease sales. The contribution of the alternative to cumulative impacts is moderate in

the case of only the resources described as developed or all resources leased and developed in the planning areas.

d) Air Quality: The five exploratory wells drilled in St. Matthew-Hall planning area will not effect the existing air quality. No development is expected to occur as a result of this alternative.

Conclusions. The level of expected impacts to air quality in the area is very low.

Cumulative Impacts. Cumulative impacts are identitical to Alternative II impacts. Very low impacts result as there is no other activity expected to occur in the area over the next 30-35 years and OCS exploration (5 wells) will not contribute significant amounts of air pollutants.

e) Recreation and Tourism: There is some tourism and recreation on the shores bordering the east of this planning area and on St. Matthew and Nunivak Island. Impacts are expected to be moderate compared to other planning areas. Impacts related to the occurrance of oilspills from exploration and development depend on, 1) the amount of major shoreline designated or used for recreation, 2) amount of shoreline designated as environmental preservation area, and 3) oilspill factors such as miles of exposed shoreline front as a percentage of the total shorefront, amount of seasonal use, and the cleanup capability available. Major shoreline use and destination areas are limited while the amount of designated environmental preservation area is high. The Yukon Delta National Wildlife Range is the entire eastern boundary of the planning area. Oilspills would have a low impact on the recreational and tourism resources of this area, due to low visitation rates and limited destination areas.

Conclusions. Very low impacts are expected on the small amount of tourism in the area.

Cumulative Impacts. Cumulative impacts are expected to be very low.

f) Socioeconomic Factors: There are no expected economic and population impacts in onshore areas adjacent to the St. Matthew-Hall area because this area is considered to have a zero probability of discovery of commercial quantities of petroleum resources.

Conclusions. Impacts are expected to be very low.

Cumulative Impacts. Cumulative impacts are expected to be very low.

g) Native Subsistence Cultures: The St. Matthew-Hall planning area lies offshore the Yukon-Kuskokwim delta region. The adjacent onshore area contains some 57 Yupik Eskimo speaking subsistence villages represented by the Association of Village Council Presidents. In 1980 this region had a total population of 15,664, of which 13,594 (87 percent) were Alaska Native people. Excluding the regional population center of Bethel (as a way of better representing village population characteristics), the region had a total population of 12,088, of which 92 percent (11,177) were Alaska Natives.

Population growth associated with OCS activities in the planning area should not directly impact the villages, although indirect effects could result in reduced transportation (air and barge) supply and increased transportation costs due to increased regional demand for different modes of transportation. Perceived or actual impacts from oilspills or other effects of offshore operations could more directly effect subsistence cultures in the villages. (See discussion under the proposal for the North Aleutian Basin planning area.) Traditional Yupik Eskimo lifeways are fiercely protected and maintained among the people of the region and the reliance on subsistence resources is a cultural and economic necessity. The villages are the staging areas for subsistence pursuits, and subsistence is the reason the people are able to live in the villages. Spiritual ties to local land, water and wildlife are still strong. Cooperative village-based hunting, fishing and gathering activities are the predominant organizing principles around which individual, family and village life are centered and organized. The precarious balance exercised at the village level in maintaining well being in the context of subsistence and cash economies (see the discussion under Subsistence in for the North Aleutian Basin planning area protion of this section), is one of the principle characteristics of the region and reflects the importance of even localized impacts.

No commercial quantities of hydrocarbons are expected in the St. Matthew-Hall planning area therefore no oilspills are expected to occur. However, should the lease sale scheduled to take place under this alternative result in the production of commercial quantities of hydrocarbons, oilspill damage or other disturbances to local subsistence resources could both directly and indirectly effect subsistence villages. The diversion or displacement of subsistence resources through ecological change could impact village people in attempting to redirect efforts to harvest similar or alternative resources, if available within a reasonable distance. Social and cultural stress associated with shortages of customary and traditional resources in the places where they are usually found could arise and become chronic as a result of perceiving the effects of one event to represent an ever present threat to existence. Localized effects could result in widespread cultural discontinuity due to the kinship based mutual assistance networks existing in the area, the overwhelming cultural and economic dependency on subsistence resources found in the villages, and the delicate and therefore, highly vulnerable margin of economic existence carried out as a result.

Conclusion. Impacts on village subsistence cultures over the life of the alternative are expected to be very low as a result of the very unlikely prospect of discovering commercial quantities of recoverable hydrocarbons in the planning area.

Cumulative Impacts. In the unlikely event that all areas of the St. Matthew-Hall planning area are leased and all resources are subsequently developed over the life of the proposal, no oilspills greater than 1,000 barrels are expected to occur. An unknown quantity of oilspills is expected to result from tankering from Federal OCS lease sales in the Barrow Arch, Hope, Norton and Navarin planning areas. Additionally an unknown number of oilspills also could occur from development of State of Alaska leases in in Hope Basin and Norton Sound and tankering from the Canadian Beaufort.

Additional projects or activities that could contribute to cumulative impacts in the planning area are State and private onshore and nearshore leasing, increased ship traffic resulting from improvement of the Port of Nome, and increased ship traffic generally due to other sales proposed under this alternative in the northern protion of the State.

These total projects or activities could effect Native subsistence cultures in in that oilspill damage or other disturbances to local subsistence resources could divert, displace or reduce the availability of subsistence resources. Major disruption in the access to or availability of local subsistence resources where they were traditionally found could disrupt traditional subsistence effort patterns; such disruptions could a) reduce subsistence catch of the resources customarily used, b) prevent the pursuit of subsistence practices by segments of the population due to the costs of using an increased subsistence range, c) disrupt traditional (cultural and spiritual) patterns of obligation, d) impair fulfillment for kinship-based assistance networks and care of the elderly and e) induce chronic stress and anxiety over imbalances in nature, i.e., the fear of further changes in such relationships, and the inability to do anything about it. Impacts from such effects could include increased disease, malnutrition and mental disorders, family breakup and conflict, substance abuse and generational conflict. Localized impacts could be magnified within the region through the breakdown of customary inter-village (through family networks) resource distribution patterns and obligations.

The cumulative impacts of these oilspill events, projects and activities are expected to produce a high to very high impact to Native subsistence cultures in the St. Matthew-Hall planning area.

In relation to the unlikely case of all resources in the planning area leased and developed, the alternative contributes no spills greater than 1,000 barrels. The alternative contributes insignificantly to the total cumulative case. Consequently, the most important casual agent for potential cumulative impacts on Native subsistence cultures is the tankering from offshore and onshore oil development to the north and west of the planning area.

The contribution of the alternative to cumulative impacts is insignificant in either the case of only the resources described as developed or all resources leased and developed in the planning area.

3) Impacts on Other Management Plans

Coastal Zone Management: A Coastal Resource Service Area has been established in the region. A coastal plan for the region is being prepared by Nunam Kitlutsisti.

4) Unavoidable Adverse Impacts: Oilspills, discharges of drilling effluents (muds, cuttings, and formation waters) and sewage disposal would result in unavoidable adverse impacts to water quality under the proposal. Impacts from all the above except oilspills could be mitigated by EPA NPDES regulation.

Water supply would be unavoidably adversely affected by this proposal. Limited supplies would be consumed by OCS-related infrastructure and development, creating demands on supplies of unknown quanity.

The unavoidable adverse impact for land use would be a reduction in the amount of land available for other uses. Occupation of land by OCS-related activities and structures would be minimal.

Coastal ecosystems would be unavoidably adversly affected by oilspills and various discharges in a manner similar to that discussed above under water quality. The level of impact would be restricted both geographically and temporally.

The proposal would have unavoidable adverse impacts on fish by oilspills contacting nearshore habitats or eggs and larvae which occur on or near the surface. Oilspills would also affect commercial fishermen by reducing the number of harvestable fish. These impacts are expected to be minimal.

Birds, marine mammals, and endangered species would also suffer unavoidable adverse impacts from oilspills. The level of impact would depend on where and when the oilspill occured. Consultation with NMFS and FWS in accordance with the Endangered Species Act of 1973, is required and will be conducted as needed.

Recreation and tourism resources could be adversely effected unavoidably through damage to visual resources and the intrusion of onshore support infrastructure, road systems, nearshore causeways, pipelines and drilling islands, offshore oil and gas platforms, and vessel and aircraft traffic supporting such operations. These effects would be localized and may serve as an attraction to a segment of the recreation and tourism population.

Cultural resources offshore, such as housepits, burins, scrapers, arrowheads and other artifacts, could be unavoidably destroyed through OCS operations; the complex dynamics of the marine environment already are likely to have caused the destruction of many of these resources. Cultural resources located onshore could be lost or damaged by public pilfering or indiscriminate exposure of artifact sites.

Introduction of urban and industrial land uses, except for regional urban centers, would change the character of isolated, de facto wilderness areas, but impacts would be isolated and small in relation to the total area involved. Where urban centers are involved, land use demands generated by OCS activities could unavoidably produce adverse effects derived from the rate and relative scale of demand. Land speculation and price inflation could be experienced as well as interruptions in community facilities and infrastructure during the period necessary for such aspects of land development to catch up with increased land use demands.

Native subsistence cultures could be adversely effected directly in an unavoidable way through accidental oilspills and an increase in population, factors which could effect the access to and availability of subsistence resources. Such impacts have been discussed previously. Localized effects in villages could have adverse effects throughout the village region. Disruption of customary urban-village migration patterns, through effects such as urban housing shortages, inflation or reduced supply of public services, could cause hardship for those segments of the population unable or unwilling to adapt to such changes and contribute to social disorder and disorientation of cultural value systems.

5) Relationship Between Local Short-Term and Uses and Maintenance and Enhancement of Long-Term Productivity: The effects of the alternative would vary in kind, intensity, and duration, beginning with preparatory activities (seismic data collection and exploration drilling) of oil and gas development, and ending when natural environmental balances might be restored.

Biological productivity would be lost in the short-term on all onshore lands used in the proposed project. These areas could be returned to productivity in the long-term with proper management. Restoration may not be entirely feasible; however, the overall loss would be a minor adverse effect. The direct land requirements would show in both the short-term and the long-term because of disturbance. Major construction projects would cause definite changes in both the short-term and long-term.

Short-term oil pollution and the possibility of long-term cumulative oil pollution impacts could cause serious adverse effects on all components of the marine ecosystem, including fisheries. While restoration would allow fisheries production to regain original levels, any reduced annual harvests during the life of the project would be irretrievably lost. The extent is not known presently, but the potential must be recognized.

Freshwater pollution from onshore activities is a short-term effect. The long-term decrease in water quality amy be considered to be a tradeoff for obtaining oil and gas resources.

The biota would be threatened in the short-term by potential oil pollution. Direct mortality could be significant through the combined effects of harassment by humans and the increased volume and frequency of noise from vessel traffic or overflying aircraft. In the long-term, such distrubances could alter behavior patterns and could drive fauna away from traditional feeding and breeding grounds or to other critical areas within their range, reducing species populations over a long period of time.

Habitat destruction could cause a reduction in subsistence species which could threaten the regional economy. The improved accessibility to primitive areas from increased construction is a short-term result of this alternative. The overall widerness value of the coast may decrease from increased land use. Increased human populations in the short-term could change the regional Native culture in the long-term. The subsistence way of life could be modified and population shifts could occur. The overall changes cannot be termed positive or negative, except by those affected.

Archaeologic and historic values discovered during development would enhance long-term knowledge. Overall, finds may help to locate other sites, but destruction of artifacts would represent long-term losses.

Consumption of offshore oil and gas would be a long-term use of non-renewable resources. Economic, political, and social benefits may accrue from the availability of oil and gas. Most benefits would be short-term and would decrease the nation's dependency on oil imports.

The production of oil and gas from the planning area would provide short-term, critically needed energy, and perhaps, provide time either for the development of long-term alternative energy sources or substitutes for existing petroleum

sources. Petroleum development in these areas may mean the irreplaceable loss of some fisheries production. The maintenance and enhancement of long-term producitivity would depend on efforts to control water quality levels. Regional planning would aid in controlling changing economics and populations, and thus, in moderating any adverse impacts.

6) Irreversible and Irretrievable Commitment of Resources

a) Mineral Resources: Resources discovered would be irretrievably consumed.

b) Biological Resources: Commercial fishery losses may occur principally by oilspills interfering with salmonid migrations or by their direct contact with larval fishes and/or their planktonic food supplies. Any losses of commercial fishing incomes attributable to this alternative would be irreversible and irretrievable to the extent they were uncompensated. Unharvested commercial finfish and shellfish, as renewable resources, would be irretrievably lost to the economy.

Increased air and ship traffic and onshore activites, as well as potential habitat degradation or reduction in available food resulting from oil and gas industry operations could displace birds and mammals into less favorable environments, ultimately resulting in reduced population levels. Displacement could become irretrievable if permanent alterations of the environment were maintained by such activities.

c) Endangered Species: Under the Alternative, it is possible that endangered whales could be subjected to irreversible direct and indirect effects of oilspills, disturbance due to noise and other human activities, or losses or deterioration of habitat due to facility developments. Whether such effects would lead to permanent (irreversible) losses of whale resources is unknown.

d) Social Systems: Village subsistence practices could be affected irreversibly by the displacement of subsistence resources from locally-used customary habitat or by the reduction of resources through the modification of favorable habitat. The displacement could be irretrievable if the effect were maintained over time. Irreversible changes in cultural values and orientations could occur from the proposal, but the irretrievable nature of these changes to sociocultural systems is unknown.

A high growth situation could cause increased housing costs and shortages and could place extreme demands on utility services such as electrical power, water, sewage, and solid waste disposal. Attempts to provide basic service levels for the above items to meet increased population levels could force communities to forego improvements to the existing services.

Due to the increase in air and marine traffic generated by this alternative and, more importantly, the severely inclement weather to which the area is prone, it is highly probable that there would be an increase in transportation related fatalities over the life of the proposal.

e) Economic Systems: The only commitment that could possibly be considered irreversible and irretrievable would be the economic risk, of

THE MORE SIGNIFICANT ENVIRONMENTAL CONSEQUENCES

St. Matthew-Hall

Resource Category	Level of Expected Impacts* Scheduled Sales Only Under Alternative II	Cumulative Impacts of All Activities
1. General Impacts		
a. Coastal Ecosystems	very low**	low to moderate
b. Water Quality and Supply		
Water Quality	very low**	very low
Water Supply	very low**	very low
c. Navigation and Shipping	very low**	very low
d. Other Uses of the OCS	n/a	n/a
e. Land Use	moderate**	moderate
f. Cultural Resources	low**	moderate
2. Impacts of Special Concern		
a. Fish and Commercial Fisheries		
Fish Resources	very low**	moderate
Commercial Fisheries	very low**	low
b. Endangered Species		
Cetaceans	low**	low
Birds	very low**	very low
c. Habitats and Resources of Special Concern	low**	low to moderate
d. Air Quality	very low**	very low
e. Recreation and Tourism	very low**	very low
f. Socioeconomic Factors	very low**	very low
g. Native Subsistence Cultures	very low to low**	high to very high

* Definitions of level of impact are provided at the beginning of Section V.D.

** Differs from the proposal.

destruction of commercial fisheries resources or destruction of other fauna or flora used for subsistence by area residents.

f) Cultural Resources: The destruction of an underwater OCS cultural site could result in an irreversible and irretrievable loss of prehistoric information about human occupancy.

d. Alternative III-1.

No sales are scheduled in the St. Matthew-Hall area under this alternative. Therefore, no direct impacts result from activity within the planning area.

e. Alternative III-2.

No sales are scheduled in the St. Matthew-Hall area under this alternative. Therefore, no direct impacts result from activity within the planning area.

f. Alternative IV-1.2.

No sales are scheduled in the St. Matthew-Hall area under this alternative. Therefore, no direct impacts result from activity within the planning area.

g. Alternative IV-1.b.

No sales are scheduled in the St. Matthew-Hall area under this alternative. Therefore, no direct impacts result from activity within the planning area.

h. Alternative IV-2.a.

No sales are scheduled in the St. Matthew-Hall area under this alternative. Therefore, no direct impacts result from activity within the planning area.

i. Alternative IV-2.b.

No sales are scheduled in the St. Matthew-Hall area under this alternative. Therefore, no direct impacts result from activity within the planning area.

17. Norton Basin

a. Alternative I-1

1) General Impacts

a) Coastal Ecosystems: The Norton Basin planning area encompasses an important habitat for migratory birds and marine mammals that could be adversely impacted. The estuaries and river deltas of this region are important habitats, especially that portion of the Yukon River Delta included in the proposed sale area. Important seabird colonies and the adjacent ocean feeding areas include: St. Lawrence Island, Little Diomede Island, Fairway Rock, King Island, Sledge Island, Egg Island, Besboro Island, Cape Denbigh, Rocky Point, and Cape Darby.

For impacts on sensitive fish areas, see discussion under Gulf of Alaska. The Yukon River Delta, Norton Bay, and Port Clarence are the major fish habitats in this area.

Populations of bird, fish and marine mammal species could be effected by noise and pollutant events that affect coastal breeding and feeding areas. These types of impacts would likely occur during the development phase and could result in 1) avoidance of traditional use areas, and 2) possibly some reductions in numbers of animals. For further discussion refer to Section V.17.a.2)a),b) and c).

Over the life of the proposal, 0.9 oilspills greater than 1,000 barrels and 0.4 oilspills greater than 10,000 barrels are expected to result from Alternative I-1. Given this low number of expected spills the levels of impacts on regional coastal ecosystems is expected to be low. However, it is possible, though unlikely, that an oilspill would occur and produce a local impact on an important coastal area.

Conclusion. The level of impacts on the coastal ecosystems of Norton Sound is expected to be low.

Cumulative Impacts. In the unlikely event that all areas of the Norton planning area are leased and all resources subsequently are developed over the life of the proposal, the expected number of oilspills is 1.2 spills greater than 1,000 barrels and 0.5 spills greater than 10,000 barrels. An additional unknown quantity of oilspills is expected to result from tankering from Federal OCS lease sales in the Barrow Arch and Hope Basin planning areas as well as oil from tankering of State of Alaska territorial waters in Norton Sound and Hope Basin. An additional project that could contribute to the cumulative impacts in the planning area is the leasing of lands owned by Calista Corp. in the Yukon River Delta.

These total projects or activities would effect the fisheries and waterfowl habitat of the Yukon Delta and inner Norton Sound mammal habitats and seabird colonies of St. Lawrence Island Sledge Island, and Diomedes.

The cumulative impacts of these expected oilspill events, projects and activities are expected to produce a moderate to high impact to these habitats in the Norton Sound planning area.

In the unlikely event that all resources in the planning area are leased and developed, the alternative contributes about 75 percent of spills greater than 1,000 barrels and about 80 percent of spills greater than 10,000 barrels. These proportions are reduced significantly when the tankering from other Federal OCS planning areas and State lease sale areas (to an unknown extent) are considered. Given the aformentioned circumstances (tankering of oil from adjacent Federal and State lease sales) the alternative contributes a small amount to the total cumulative case. Consequently, the most important causal agents for potential cumulative impacts on coastal ecosystems is the leasing of State waters and the tankering of oil from other proposed leases. The contribution of the alternative to cumulative impacts is minor in either the case of only the resource described as developed or all resources leased and developed in the planning area.

b) Impacts on Water Quality and Supply

Water Quality Onshore: Onshore water quality is mostly pristine. Mining activity, particularly near Nome, has in the past, and likely will in the future, have greater impact than oil industry construction. The Yukon River is turbid and would not be affected by additional sediment loads caused by construction activities. Gravel mining, to build gravel island drilling platforms, could change drainage patterns and increase siltation and turbidity in surface water. All impacts except diversion of drainage patterns would be short-term.

Offshore water quality in the Norton Sound is pristine. If expected commercial quantities of oil and gas occur, 310 million barrels of formation waters would be produced. The predicted numbers of oilspills are 0.9 for spills of 1,000 barrels and 0.4 spills of 10,000 barrels or greater. Over the years of exploratory and developmental drilling, approximately 12,400 cubic yards of drill cuttings and 37,200 barrels of drilling mud would be discharged. These discharges would cause negligible reductions in water clarity relative to those which will occur if gravel islands are used for exploratory or production platforms. However, the total annual input of mud, cuttings, and gravel to Norton Sound by oil industry would be far less than that from the Yukon River or that which is resuspended from the shallow sound bottom during frequent storms. If formation waters were discharged, they would release the equivalent of 62,000 barrels of oil into sound waters as dissolved hydrocarbons. Overall, the impact on water quality of the sound would be moderate, chronic, oiling of sound waters. A major spill is unlikely, but, if one occurred, it would only temporarily degrade water quality in the vicinity of the spill.

Water Supply: Water supply facilities in this area are at best limited, and are non-existent at many locations. The oil industry would have to develop its own water supply facility for support activities (assumed to be located at or near Cape Nome). As oil and gas industry uses will most likely compete with existing uses and populations, the impacts are expected to be high to very high.

Conclusions. The effects on water quality from OCS activity are expected to be low, except possibly in the immediate vicinity of platforms. There are few developed water systems to support OCS activity; new water supplies would have to be developed. Consequently, impacts on water supply would be high to very high.

Cumulative Impacts. If all potential oil and gas resources of the Norton Basin planning area are leased and subsequently developed over the life of the proposal, the expected number oilspills is 1.2 spills of 1,000 barrels or more with 0.5 spills of at least 10,000 barrels. An additional unknown quantity of oilspills is expected to result from tankering from Federal OCS lease sales in Hope Basin and Barrow Arch planning areas as well as from development of State of Alaska onshore and offshore reserves in Norton Basin, and Hope Basin areas and from development of Native Corporation onshore reserves near the Barrow Arch area, and from tankering of Canadian Beaufort Sea crude. Oil industry development of all gas and oil reserves in the Norton Basin planning area would result in discharge of 16,600 cubic yards of drill cuttings and 49,000 barrels of drilling mud during drilling phases. Formation waters produced would total 415 million barrels over the life of the field. Additional projects or activities that could contribute to cumulative impacts in the planning area are increased commercial fishing traffic, onshore mining, and gravel drilling island construction. Sewage, fish waste, and suspended solid inputs from these projects and activities could locally degrade water quality by increasing turbidity, decreasing oxygen levels, and stimulating algal and bacterial growth. There would also be additional risk of fuel spills. The cumulative impacts of these oilspill events, discharges, and additional traffic are expected to produce a moderate impact to water quality in the planning area.

In the event that all resources in the planning area are leased and developed, the Norton Basin planning area in this alternative contributes 75 percent of spills of 1,000 barrels or more and 80 percent of spills of at least 10,000 barrels. The Norton Basin planning area in this alternative would provide 75 percent of the cumulative impact to the planning area from drill cuttings, 75 percent of the impact from drilling mud, and 75 percent of the impact from formation waters. The greatest threat to Norton Basin water quality is from oil pollution.

The percentage of cumulative impact from oil pollution due to the development within the Norton Basin planning area portion of the alternative is reduced greatly when tankering from other Federal OCS planning areas, State and Native Corporations proposed leases, and Canadian leases are considered. The Norton Basin planning area in this alternative contributes slightly to the total cumulative planning area case. The most important causal agent for potential cumulative impact on water quality is potential tankering of Canadian crude. The contribution to the Norton Basin planning area in this alternative to cumulative impacts is minor in either the case of only the resources described as developed or, of all resources leased and developed in the planning areas.

If all potential oil and gas resources of the Norton Basin planning area are leased and developed, new water supply facilities would be required, causing very high impact. Other cumulative impacts are expected from mining, State and private onshore and offshore oil development, commercial fisheries, and general commerce. The sum effect of these impacts is likely to be very high on water supply. The proposal in this planning unit constitutes a major portion of total demand on water supply.

c) Navigation: The three lease sales forecast for the Norton Basin may result in localized short-term congestion in and around the Port of Nome. This congestion should be intermittent and of brief duration. Dock

facilities, under contract, to be built by the City of Nome should be sufficient to accomodate cargo requirements. The three platforms considered for possible field development are not expected to pose a navigational hazard.

Conclusion: Impacts would be very low.

Cumulative Impacts. Future traffic levels in the Norton Sound will be generated as a result of fishing activities, mining activities, freighter movements, and oil and gas exploration and development activities in the Barrow Arch and Hope planning areas, the Canadian Beaufort and State of Alaska lease sale activity on Yukon Delta lands. Resource levels of the potential State sale are unknown. It is estimated that some ten-to-twenty percent of all traffic passing through the Norton Sound may be due to OCS activities. OCS impacts to the Norton Sound navigation systems under both the total development and most likely development cases, must be considered a major contributor to the overall cumulative impacts on navigation. Still, however, impacts to nagivation from anticipated activity (OCS and non-OCS) is expected to be low.

d) Other Uses of the OCS: The main uses of the area are for subsistence hunting and fishing which are discussed in Section V.D.17.a.2)g).

e) Land Use: Nome is site of the only large-scale infrastructure in the area. However, either an enclave development at Cape Nome for on oil terminal, LNG plant and support/supply facilities forecast for the Norton Basin sale area, or offshore loading is assumed for the proposal. This is preferred by the oil industry. In addition enclaves or other loading will minimize conflicts with established areas, both in terms of land use and in competition for goods and services. There would be some localized land use impact, as the enclave would likely be located in a previously undeveloped area and require 150 acres. Part of the impetus for expanding the Port of Nome comes from potential support for OCS development activities.

Conclusion. Except for Nome and small native communities, the area is mainly undeveloped. Land use impacts would be moderate as plans may require changes to accommodate land use changes in enclave areas, or new plans may be required.

Cumulative Impacts. Other projects that will affect land use in the Norton Basin area are tankering and commercial vessel traffic, the Lost River Mining operation, State and Native corporation oil and gas leasing, port development in Nome and a small commercial fishery. These should affect land use in the following ways: a small facility would be developed to support the Lost River mining operation (2 acres) and additional land (10 acres) would be affected in Nome. State oil and gas operations would be handled out of facilities used to handle OCS development resulting from the proposal. All activity is expected to result in moderate land use impacts. The proposal is a major contributor to land use changes in the planning area if enclaving occurs (as opposed to offshore facilities).

f) Cultural Resources: Increases in population around Nome would increase visits to archaeological and historic sites in that area. (See OCS Lease Sale 57 FEIS for details on impacts and resources). Access of Natives to religious sites may be cut off. Possible looting could take place by people unfamiliar with the protection laws regarding these sites. Oiling of archaeological sites in the beach areas is possible; however, there are ways of

differentiating carbon dates from oiled material and natural dates. As settlement is expected to occur in an enclave, only sites in the vicinity of the enclave are expected to be damaged.

Conclusion. Impacts on cultural resources are expected to be low to moderate, depending on the location of OCS-related facilities, as there are several known and suspected sites in the Norton Sound area.

Cumulative Impacts. In the unlikely event that all areas of the Norton planning area are developed over the life of the proposal, the expected number of oilspills is 1.2 spills greater than 1,000 barrels and 0.5 spills greater than 10,000 barrels. An additional unknown quantity of oilspills is expected to result from tankering from Federal OCS lease sales in the planning areas. An additional unknown number of oilspills could occur from development of State of Alaska territorial waters in areas to the North. Additional projects or activities that could contribute to cumulative impacts in the planning area are the Canadian tankering, expansion of Port of Nome, and small commercial fishery. These total projects or activities would affect cultural resources by population impacts (such as wear on resources and looting), and oiling of artifacts. The cumulative impacts of these oilspill events, projects, and activities are expected to produce a moderate impact to cultural resources in the Norton planning area.

In the unlikely event that all resources in the planning area are leased and developed, the alternative contributes 75 percent of spills greater than 1,000 barrels and 80 percent of spills greater than 10,000 barrels caused by OCS activity in the planning area. When the tankering from other Federal OCS planning areas and State lease sale areas (to an unknown extent) are considered the alternative contributes moderately to the cumulative impacts. The most important causal agent for potential cumulative impacts on onshore cultural resources is increased population in the region not related to OCS development. The contribution of the alternative to cumulative impacts is minor as is the contribution of OCS development in the region even with all resources developed. OCS development from adjacent regions and hydrocarbons carried on tankers traversing the area carrying State and Federal crude are major contributors.

2) Impacts of Special Concern:

a) Commercial and Subsistence Fisheries

(1) Important Fish Resources: The important commercial fishery resources of the Norton Sound planning area include all five species of Pacific salmon, king crab, Pacific herring, and several species or groups of bottomfish (Arctic cod, saffron cod, yellowfin sole, and starry flounder). Subsistence fisheries tend to rely more heavily on salmon, and herring and to a lesser degree on crab and other shellfish. Areas of special concern are the highly productive salmon fisheries of the Yukon River Delta, the coastal herring fisheries of inner Norton Sound from Stuart Island to Golovin Bay, and the king crab fishery of Cape Nome. Impacts to these resources would result from accidental oilspills and discharge of drilling effluents and wastes.

Over the life of the proposal, 0.9 oilspills greater than 1,000 barrels and 0.4 oilspills greater than 10,000 barrels are expected to result from Alternative

I-1 Norton Sound sales. Oilspills can impact fish populations by causing short-term acute impacts or long-term sublethal impacts. Since most oil remains at or near the surface, the species that are most vulnerable are those that inhabit the surface layer or shallow nearshore at least some time during their life cycle. These species include salmon (adult and juvenile of all five species, and egg and larvae of pink and chum salmon), herring (all life stages), king crab (larvae) and several species of demersal (bottom) fish (eggs and larvae).

Salmon: Adult salmon (of all five species) would be vulnerable to oil contamination if a spill contacted areas in or near the mouths of rivers during or preceeding periods when these fish are congregating near these river mouths prior to migrating up river to spawn. Smolt would be susceptable to adverse impacts in the same areas during out-migration or in nearshore areas during their first few months in the marine environment. Pink and chum salmon would be vulnerable during all life stages as these species spawn intertidally to some degree. Vulnerability to any of the five species would vary depending on the timing of the spawning or out-migration of a particular population or run. The five adult species in this planning area exhibit a period of vulnerability (spawning period) of approximately three to four weeks. This period of vulnerability occurs between the months of May and September. Little is known about the movements of juvenile salmon. They make coastwide movements (lateral to shore), feed and grow in the intertidal, and move offshore over a period of several months.

If it is assumed that an oilspill contacts a nearshore area, especially off the mouth of a salmon river (such as the Yukon) several impacts could occur. These impacts could be any of a variety of lethal or sublethal toxic responses, or the loss of fish prey organisms. Adult salmon are highly mobile, and some evidence suggests that this life stage could detect and avoid toxic levels of aromatic hydrocarbons in solution (Weber et. al., 1981). Therefore, the major concern seems to be that these adults would avoid areas of contamination, which if located off the mouths of major spawning rivers would result in delays in spawning runs or actual blockage of the river or stream. Given the fact that oilspills in the marine environment generally result in concentrations less than those which have proven toxic to adult salmon (Malins, 1977), it is quite unlikely that this type of impact would occur. Even if toxic concentrations did occur, these concentrations would not remain long in marine waters, especially off the mouth of major rivers where dilution would occur rapidly.

Salmon smolt on the other hand would perhaps be more vulnerable in that they would remain in nearshore waters for longer periods while they feed and grow in preparation of movements farther offshore. However, like adult salmon juveniles appear to possess the ability to detect toxic concentrations of petroleum hydrocarbons (Maynard et al., 1981). If this is the case, then oilspills in the nearshore area could possibly be avoided to some degree by juveniles. Additionally, as stated above, toxic concentrations in the range of concern (5-15 parts per million [Maynard et al., 1981] of aromatic hydrocarbons) would not be expected in marine waters. However, considering that a spill could remain several days or several weeks in coastal waters, portions of a population may be subject to prolonged stress from sublethal effects.

The eggs and larvae (early life stages) of pink and chum salmon, that occur in marine intertidal areas, would be the most vulnerable life stage of these animals. It would be difficult to quantify the impacts to a local salmon fishery from oilspill contamination in a spawning or larval rearing area. However, it is possible that a large portion of eggs and larvae could be lost. The gravity of this loss, however, becomes somewhat masked when one considers that natural mortality of eggs may be as high as 75 percent for each of these life stages. The difficulty would be ascertaining what percentage of those lost from oil pollution would have died naturally. It is possible that most of a year class from a local population could be lost. When considering the large annual fluctuations in these species, however, this may not always be significant. Generally, the loss of a year class is not a desirable effect since it can significantly reduce later year population levels.

Given the extremely low number of expected oil spills, and the narrow periods of vulnerability at least for adult and juvenile salmon, it is unlikely that an oilspill would contact important nearshore areas during the period when salmon are present. Additionally, oilspill trajectories modeled for Sale 57 (BLM, 1981) indicated a very low probability that any of the important salmon intertidal areas would be contacted by an oilspill.

Shellfish: King crab adults spend the winter months in deep water (150-400m) and migrate to shallow (6-20m) waters in the spring and summer to spawn. During this period, the eggs which have been carried by the female since the previous spawning period, hatch and become free swimming planktonic larvae.

Distribution of these most sensitive larval forms is generally widespread, and therfore, would be the most susceptible to contact by an oilspill. The likelihood of such an interaction then is high at least once during the life of the field. However, even in the case of a very large spill (10,000 barrels or greater) in the Norton Sound region, only an insignificant percentage of crab larvae would be contacted by concentrations of oil (1-10 ppm) that would cause mortality. Therefore, the level of impact on crab larvae is then expected to be low for regional populations.

Another effect on crab populations may result from oil sinking to the bottom and contacting aggregations of adult or juvenile crab or by contaminating large areas and affecting their food supply. There is greater opportunity for this phenomenon in shallower, nearshore waters where adult and juvenile crab spend lengthy periods. The likelihood of such an event is somewhat less than contact to the larval stage, however, given the broad distribution of crab populations. Adult and juvenile crab are less vulnerable than larval stages. The level of impact to these life stages on a regional basis is low. Local crab populations in nearshore waters especially off Cape Nome could, however, suffer at least one short-term decline if their habitat is affected.

Herring: Herring are most vulnerable from oilspills as spawning adults, eggs, and larvae; these life stages occur almost exclusively in nearshore waters. In May and June, herring of this region move into the nearshore areas from Stuart Island around inner Norton Sound to Golovin Bay to deposit their eggs on vegetation (kelp and eelgrass) or rocky substrate. Eggs hatch within a month and larvae spend about two months in nearshore waters prior to changing into juveniles and moving offshore.

Because of the low number of expected spills and the low probability of contact to these spawning areas (BLM, 1981), it is very unlikely that herring would be contracted by an oilspill under this alternative.

If an oilspill did contact one of the spawning areas during the spawning or larval rearing period, it is possible that adverse consequences to the local herring population would occur. These consequences could include egg or larval mortalities, contamination of spawning substrate, loss of organisms upon which larval herring feed, as well as adult mortalities. It is possible that a year class from the impacted area would be lost as a result of this impact. The extent of these losses would depend on many factors, with the size of spill and size of the affected area being the greatest determinants. It is also possible that only a portion of the spawning population, eggs, or larval herring would be affected in a given area. Given that extreme environmental conditions (i.e., shortage of food supply, storms, etc.) cause extremely high egg and larval mortality (as high as 99 percent for larvae and 60 to 90 percent for eggs (Smith, 1976)), the loss attributable to an oilspill could be extremely small. Even in the worst case, however, the loss of a local year class would not represent a significant regional impact to the total biomass.

Demersal Fish: Demersal species including halibut would be less affected by an oilspill than any other species group. The most vulnerable species are those which have egg or larval forms that inhabit surface or nearshore surface waters. Important species in the Norton Sound region which display this characteristic are yellowfin sole, starry flounder, Arctic cod, and saffron cod. Because fish eggs and larvae are relatively sensitive to hydrocarbon contact, and because of the broad distribution of these life stages throughout the region, it is likely that the one oilspill would result in a low ecological loss to these species. The level of impact on a regional basis, would be low.

Several types of discharges and effluents could be released during OCS oil and gas activities. OCS Operating Orders prohibit disposal of any waste material into the ocean that will create conditions which will adversely affect aquatic life. Disposal of waste materials is regulated by the Environmental Protection Agency. Of concern are drilling muds because very little is known about their long-term, chronic impacts. There are indications that these muds could produce elevated trace metal concentrations in marine organisms and interfere with reproductive processes. However, given that only 21 exploratory and 41 productive wells are projected for this alternative, a relatively small amount of effluent material would be discharged, (Section V.D.17.a.1)b) and a small demersal area would be affected. Therefore, impacts to fish and shellfish are expected to be very low.

Conclusion. Fish and shellfish that occupy surface and nearshore waters at least some portion of their life history are expected to suffer low ecological losses. Local impacts to pink and chum salmon, and king crab could be high but these animals would recover rapidly. Overall, regional impacts to fish and shellfish would be low.

Cumulative Impacts. In the unlikely event that all tracts in the Norton Sound planning area are leased and developed (total resource development) during the life of the proposal, the expected number of oilspills is 1.2 for spills greater that 1,000 barrels, and 0.5 for spills greater than 10,000 barrels.

Other activities that could possibly increase the number of expected oilspills would be the tankering of oil produced from the Barrow Arch and Hope Basin planning areas, and the Canadian Beaufort Sea through the proposed leasing areas. Additionally, the State of Alaska proposes to lease (Sale 38) territorial waters (3 miles from shore) all around inner Norton Sound and the Yukon Delta, and the Calista Corporation proposes to lease lands on the Yukon Delta for the purposes of oil and gas development. As a result of the above proposed activities an unknown number of oilspills is expected to occur. Because of the location of the State of Alaska and Calista Corp. proposed sales and additive effects of tankering thereby increasing the number of spills, the level of impact on the salmon and herring resources of the Yukon Delta and inner Norton Sound is expected to be moderate.

Fish populations (salmon and herring) are also stressed by harvest pressure. In the Norton Sound region, the harvest pressure on herring can have demonstrable effects on population size, and can result in high ecological losses if overharvest occurs.

Because of (1) the low number of expected spills as a result alternative I-1, (2) the increased distance of possible lease areas offshore from the vulnerable fish habitats, and (3) the stress from harvest pressure, the contribution of the proposal to the cumuative case would be very small. The single most important contributor to oilspills that would impact critical fish habitats would be the proposed State of Alaska sales as a result of their close proximity to these habitats. The contribution of the proposal to the cumulative case when only the resources described for this alternative are leased (as opposed to total development of OCS resources) is still very small.

(2) Commercial Fisheries: Impacts on commercial fishing activities under the proposed development scenarios would result largely from competition between the oil and fishing industries for labor, ocean-space use, and infrastructure services (refer to Terry et al., 1980 for a more detailed analysis). Additionally, some loss of fishery resources could occur on a localized basis as previously discussed. These losses would not be expected to occur over the long-term and therefore do not represent a significant source of conflict between the two industries. Significant regional declines in fishery stocks are also unlikely to result from OCS activities. However, if they did occur, economic losses would certainly be incurred by the commercial users of the resource or species that is affected. In the Norton Sound region, the Pacific herring fishery would be more vulnerable to this type of OCS impact than any other. Salmon fisheries could be affected; however, these effects would be short-term and localized.

Labor impacts would be centered almost exclusively in the Nome area. Since this is an area in which neither harvesting nor processing activities have been or are expected to be significant in terms of western Alaska commercial fishing industry activities, no significant conflicts for labor between the two industries are anticipated. This conclusion applies to the entire Norton Sound region as well as Nome.

Impacts resulting from ocean-space use on Norton Sound fishing grounds would result from loss of fishing grounds due to offshore pipeline corridors and emplacement of drilling platforms and increased vessel traffic in certain areas. Additionally, loss or damage of fishing gear as a result of OCS

operations could occur. The areas of joint use are very limited for the salmon and herring fisheries, because both fisheries occur in nearshore areas where little OCS activity is expected. A small area where pipeline corridors are expected to minimally reduce the area available for fishing is near Cape Nome. It is possible that one or two set gill net sites would be preempted by the proposed pipeline corridor; however, if the pipeline is buried, the sites would only be affected during the year in which the pipeline is constructed. The total loss to the fishery is expected to be minor since annual real gross income per gill net boat is not expected to exceed $6,000 in the salmon fishery or $4,000 in the herring fishery by the year 2000 (Terry et al., 1980).

Ocean-space-use conflicts resulting from platforms would also be minor if they occur at all. If it is assumed that each platform would preempt an area with a 5000-meter radius, the total area preempted by the 3 platforms suggested under this proposal would be approximately 235 hectares, which is a minute portion of the planning area. Even this very minor impact would be contingent upon how well established the bottomfish fishery becomes in this area.

Increased vessel traffic in areas of joint use would increase the potential for fishing-gear loss or damage and collisions. This may come about as a result of survey boats traversing king crab fishing areas and entangling crab pot lines with their seismic cables.

OCS supply vessels would also traverse these areas, providing additional potential for crab pot loss. The fact that this gear is unattended makes it more difficult to spot and to avoid; it also makes it difficult for a fisherman to determine the cause of the loss and to receive compensation through the Fishermen's Contingency Fund. While these losses are expected to occur, it is unlikely that significant losses in catch would result. As OCS vessel operators become more familiar with the area, these types of gear loss should decrease. Since the volume of vessel traffic in Norton Sound fishing areas is not expected to increase significantly compared to the size of the area, the probability for collisions would not be expected to measurably increase.

Gear losses as a result of oil fouling would also be unlikely. Given that the nearshore salmon and herring net fisheries are in areas of low oilspill risk (refer to discussion of fishery resources above), and that these gear types (drift and set gill nets, purse seines, and beach seines) are usually attended, the possibility of gear damage is remote.

Competition between OCS and commercial fishing for infrastructure services is not anticipated. In fact, infrastructure development as a result of OCS development may benefit the commercial fishing industry. The development of port and harbor facilities in Nome is expected to include significant improvements to the Nome port facilities and small-boat harbor. The port projects will eliminate the need to lighter freight into or out of Nome. They will significantly decrease transportation costs. The improvements to the small boat harbor are expected to be financed in part by property-tax revenues generated by OCS activities. The improved small boat harbor and port facilities will provide sufficient moorage space and water depth to allow larger boats to land fish in or operate out of Nome. This will significantly increase the ability of Nome to participate in the commercial fisheries of Norton Sound and the Bering Sea. Because there are other factors which will affect Nome's participation in these fisheries, it is not clear how the

improved facilities will change the level of commercial fishing industry activity in Nome. However, the absence of such facilities will severely limit such activities.

In other instances, commercial fishermen may benefit from OCS operations in the area. For example, oil industry equipment may be dispatched to assis distressed fishing vessels, or weather information services in the area may be enhanced and more widely distributed.

In summary, conflicts between the commercial fishing industry and the oil industry in the Norton Sound region would not be significant. Minor losses of fishing grounds and gear would occur; however, no loss of catch from these impacts would be expected. The fishing industry would benefit from development of the port and harbor facilities in Nome.

Conclusion. As a result of the proposal the level of impact to the commercial fishing industry of Norton Sound is expected to be low

Cumulative Impacts As previously noted, the cumulative impacts on fish resources (salmon and herring) in the Norton Sound would be moderate. This would result from the increased number of expected spills that result from the tankering of oil from proposed leasing of the Barrow Arch planning area and the Hope Basin planning area, tankering from the proposed leasing of territorial waters in Norton Sound by the State of Alasks (Sale 38), and the proposed leasing of Calista lands. As a result of this moderate ecological loss, the fishing industry would be expected to sustain a moderate economic loss.

The proposed marine terminal for the Lost River Mining Project, the proposed Port of Nome Deepwater Terminal, and Federal and State OCS proposed leases would act cumulatively in stimulating increased vessel traffic in the Norton Sound region. This would in turn increase the potential for ocean-space-use conflicts (i.e., loss of fishing grounds, fishing gear loss and damage, and collisions) over that which would occur only with the proposal. All of these proposals would probably have no significant effects except possibly those conflicts which arise from the State of Alaska lease sale 38. This sale could encompass areas in territorial waters (3 miles from shore) all around inner Norton Sound and the Yukon Delta which are jointly used by the commercial and subsistence herring and salmon fisheries. Therefore, it is possible that increases in ocean-space-use conflicts between the petroleum and fishing industries could occur.

The development of the terminals at Nome and at the Lost River Mining Project could enhance the fishing industry by providing increased docking space and improving the infrastructure services available to the fishing industry. The contribution of impacts from this alternative to the cumulative case as presented above is very small. The primary contributor of impacts to oilspills and ocean-space-use conflicts would be the proposed State of Alaska lease sale. The contribution of the proposal to the cumulative case when only the resources described in this alternative are leased (as opposed to the total development of OCS resources) is still very small.

b) Endangered Species:

(1) Birds: Endangered subspecies of the peregrine falcon occur during the spring and summer in the Norton Sound Basin planning

area (proposed sales 57, 88, and 99). Sledge Island, Bluff, and locations near Cape Rodney have been determined as active nesting sites. In general, nesting areas and sites for occurrence of these subspecies are associated with major sea bird colonies upon which peregrines depend as prey sources. Factors most likely to affect the peregrine falcon would be effects associated with uncontrolled airborne noise and disturbance, especially the noise and disturbance associated with supply aircraft serving offshore facilities. Disturbance from such sources could reduce the survival of nestlings. Construction of onshore facilities near peragrine nesting sites could also be a potential source of disturbance. If oilspills occur, the loss or reduction of some prey species (marine birds) would be likely to occur. However, significnat loss of prey would only occur if a major oilspill contacted seabird colonies near peregrine nesting sites.

Conclusion. The expected level of impacts on peregrine falcons is low.

Cumulative Impacts. In the unlikely event that all potential oil and gas resources of the Norton planning area are leased and all resources are subsequently developed over the life of the field, the expected number oilspills is 1.2 spills greater than 1,000 barrels and 0.5 spills greater than 10 barrels. An additional unknown quantity of oilspills is expected to result from tankering from Federal and Canadian OCS lease sales in the Arctic region as well as from development of State of Alaska territorial waters along the Norton Sound Coast. An additional project which could significantly contribute to the cumulative impacts in the planning area, is the onshore Native Corporation leasing project. Activities related to this project could affect endangered birds through oilspills, disturbance, and alteration of coastal habitats. However, the cumulative impacts of these oilspill events, projects, and activities are expected to produce a low impact to endangered birds in the Norton planning area.

In the unlikely event that all resources in the planning area are leased and developed, the alternative contributes 75 percent of spills greater than 1,000 barrels and 80 percent of spills greater than 10,000 barrels. These proportions are reduced greatly when the tankering from other Federal and Canadian OCS areas and State lease sale areas (to an unknown extent) are considered. Given that situation, oilspills from Norton Basin leasing contribute little to the total cumulative case. The most important causal agent for potential cumulative impacts on endangered birds is from onshore oil and gas State and private lease sales. The contribution of the proposal to the cumulative impacts in the Norton Basin area is minor when only the resources described for this alternative are developed as well as when all resources in the planning area are developed.

(2) Cetaceans: Endangered whales found seasonally in the Norton Basin planning unit are bowhead, gray, fin, sei, and humpback whales. The species most likely to be affected by oil and gas development in Norton Basin would be the bowhead and gray whale. The entire bowhead whale population in Alaska migrates through the Norton Basin to and from the Arctic during spring and fall migration and overwinters in the Navarin Basin and west central Bering. The western half of the Norton Basin is the major feeding area for most of the gray whale population. The other endangered whales are less common in the Norton Basin and would be unlikely to interact with OCS oil and gas activities in the lease area.

In general, widespread direct and indirect effects of oilspills on gray whales are only probable if large, catastrophic oilspills occur. Such spills are very unlikely. However, if extensive development occurs in the Norton Basin, it is very likely that there would be interaction of gray whale feeding habitat with lesser oilspills. It is possible that this interaction could be manifested by at least temporary avoidance of some feeding areas or localized reduction of productivity of benthic gray whale food organisms. Although the sale 57 EIS oilspill risk analysis indicates low to moderate risks that spills from those lease tracts could move toward major bowhead whales' migratory corridors, it is unlikely that such areas would be directly affected. Neither the magnitudes of such effects can be quantified at this time nor the definite effects of proposed sales 88 and 99 in the Norton Basin. If the latter proposed lease sales include tracts in the western part of Norton Basin north of St. Lawrence Island, potential oilspill risks and disturbance effects on gray whales and bowhead whales would very likely increase.

Section V.D.13.a.2)b) contains a discussion of the Section 7 Consultation process, conducted pursuant to the Endangered Species Act of 1973, concerning OCS Leasing and Exploration in the Bering Sea Region. Appendix G, of the FEIS for Proposed OCS Lease Sale No. 57 in the Norton Sound, contains the text of the Biological Opinion received subsequent to that Consultation.

Conclusion. OCS activities associated with the Sale 57 exploration phase would have a low impact on endangered whales. A definitive analysis of effects of development and production of oil and gas in Norton Basin on endangered whales can not be made prior to the discovery of hydrocarbons and the establishment of a development and production plan. Considerating the possible effects of proposed sales 88 and 99 endangered whale species would be moderately to highly impacted by OCS activities in the western part of Norton Basin and minimally impacted by OCS activities in eastern Norton Basin.

Cumulative Impacts. In the unlikely event that all potential oil and gas resources of the Norton Basin planning area are leased and all resources subsequently are developed over the life of the field, the expected number oilspills is 1.2 spills greater than 1,000 barrels and 0.5 spills greater than 10,000 barrels. An additional unknown quantity of oilspills is expected to result from tankering from Federal and Canadian OCS lease sales in the Arctic region as well as from development from State of Alaska territorial waters in Norton Sound. Onshore leasing (private) could contribute to cumulative impacts in the planning area. These total projects or activities could affect endangered marine mammals through oil spills, disturbance, and habitat quality. The cumulative impacts of these oil spill events, projects and activities are likely to produce a moderate to high impact to endangered whales in the Norton planning area.

In the unlikely event that all resources in the planning area are leased and developed, the alternative contributes 75 percent of spills greater than 1,000 barrels and 80 percent of spills greater than 10,000 barrels. These proportions are reduced substantially when the tankering from other Federal OCS planning areas, and State lease sale areas (to an unknown extent) are considered. Given these circumstances, oilspills from Norton Basin leasing, contributes little to the total cumulative impact. The most important causal agent for potential cumulative impacts on endangered whales is tankering from adjacent Federal lease sales. The contribution of the proposal to the

cumulative impacts in the Norton Basin area is minor when only the resources described for this alternative are developed, as well as when all resources in the planning area are developed.

c) Habitats and Resources of Special Concern: Over 95% of the 3.4 million nesting seabirds in the Norton Basin planning area are highly vulnerable to oil pollution. Over 20 million waterfowl and shorebirds occur in the area. Most of the Pacific walrus population migrates through the western part of the Norton planning area and large populations of ringed, bearded, and spotted seals occur there. Habitats of special concern to the above species include marine waters north and west of St. Lawrence island and waters of the Bering Strait. These areas are foraging habitats for millions of highly vulnerable populations of diving seabirds as well as the migration route of marine mammals. The Yukon Delta coastal zone is the most productive waterfowl nesting habitat in Alaska.

The major adverse impacts of OCS activities from the proposal could come from oil pollution of the marine environment and man-made disturbance. The species most likely to be significantly affected by the potential effects of OCS oil and gas activities in the Norton planning area are diving seabird species particularly if a major oilspill event occurred in the western part of the planning area or in the Bering Strait during the open water season when millions
of these birds are on the water. Thousands of murres and auklets would likely perish if such an event took place. Newborn ringed, bearded, and spotted seal pups would be affected if they came in contact with oil pollution. This could lead to a significant decrease in pup survivial for those populations affected. Although the oilspill trajectory data for the sale 57 proposed lease area indicates oilspill risks to the Yukon Delta are very low, contamination of large portions of the delta coastline would likely have significant long-term effects on this habitat and the waterfowl species that nest there. Noise associated with geological seismic activities particularly in the winter on shorefast ice could significantly disrupt ringed seal pupping leading to displacement of seals from pupping areas and reducing annual productivity in the affected areas.

Conclusion. Birds and marine mammals and their habitats of special concern particularly in the Bering Strait area and western Norton Basin offshore areas and the immediate coastline of the Yukon Delta, would likely be moderately impacted by effects of OCS oil and gas activities described under the proposal.

Cumulative Impacts. In the unlikely event that all potential oil and gas resources of the Norton planning area are leased and all resources subsequently are developed over the life of the field, the expected number of oilspills is 1.2 spills greater than 1,000 barrels and 0.5 spills greater than 10,000 barrels. An additional unknown quantity of oilspills is expected to result from tankering from Federal and Canadian OCS lease sales in the Arctic region as well as from development of State of Alaska territorial waters along the Norton Sound Coast. Additional activities which could contribute to the cumulative impacts in the planning area are onshore (private) leasing projects. These projects would affect birds through oilspills, disturbance and commercial harvest of bird food sources. The cumulative impacts of these oilspill events,

projects and/or activities are expected to produce a high impact to birds in the Norton planning area and a moderate to high impact to marine mammals.

In the unlikely event that all resources in the planning area are leased and developed, the alternative contributes 75 percent of spills greater than 1,000 barrels and 80 percent of spills greater than 10,000 barrels. These proportions are reduced greatly when the tankering from other Federal and Canadian OCS areas, and State lease sale areas (to an unknown extent) are considered. Given these circumstances oilspills from Norton Basin leasing contribute little to the total cumulative case. Consequently, the most important causal agent for potential cumulative impacts on birds and marine mammals is tankering from other Federal and Canadian lease sales. The contribution of the proposal to the cumualtive impacts in the Norton Basin area is considered significant when only the resources described for this alternative are developed. The contribution of the proposal to the cumulative impacts is considered insignificant however, when all resources in the planning area are developed.

d) Air Quality: A discussion of the primary factors used in assessing onshore air quality impacts which may result from OCS-related activities and the method employed in quantifying the impact on this planning area are described in Section V.A.3 of this document.

It is estimated that 21 exploratory wells will be drilled to identify the resources and 41 development/production wells and 3 platforms to develop the resources under this alternative. It was assumed, for the purposes of analysis, that production from an average platform would be 0.2 million barrels of oil and 1.8 billion cubic feet of gas per year. The oil produced in the region is assumed to be transported to shore on subsea pipeline and transported outside the region by tanker. Estimated representative emissions for exploration/development are provided in Table V.D.17.a.2)d)-1. This information is derived from Table V.A.3-1.

Table V.D.17.a.2)d)-1. Estimated Representative Emission

Activity	Production at Platform (tons per year)				
	VOC	NO_x	TSP	SO_2	CO
oil/gas	.17	24	n/a	0.03	0
barging	none	--	--	--	--

OCS platforms located within 20 miles of shore would require emission controls. However, platforms associated with the development of resources in the Norton Basin are expected to be sited beyond 20 miles from the coast. One new gas processing plant may be required for the development of the resources.

A low qualitative impact is expected from routine emissions. The area is attainment for all pollutants. An onshore gas processing plant would cause some onshore impact. Because of distance from shore, offshore emissions would not significantly affect onshore areas. If gas processing plants are not needed, the level of expected impact is very low. Because development will be well offshore, blowouts, oilspills, and fires would likely not impact the onshore air quality unless they lasted several days.

Any emission sources which would adversely affect the onshore air quality would be subject to mitigation required by EPA and the State; if located onshore, or by DOI, if located on the OCS. ERG (1981) discusses mitigation measures for OCS facilities.

Conclusion. The level of expected impacts is low. This is due to the siting of a new gas processing plant in the area.

Cumulative Impacts. It is estimated that a total of 0.3 billion barrels of oil and 3.3 trillion cubic feet of gas exist in the entire Norton Basin Federal OCS planning areas. In the event that total development of all Federal reserves occurs over the life of this proposal, 3 new platforms with wells would be required. It is very unlikely that this magnitude of development will occur over the life of this proposal.

The major influencing factors affecting the onshore air quality near the planning area as a result of this development are: 1) the number of new wells drilled, 2) the location of the platforms, 3) the timing of the activities, and 4) the instantaneous local meteorological conditions. The offshore development to regional cumulative air quality associated with OCS development and the onshore development, in the form of gas processing plants to be built, contributes moderately to the regional and local OCS related cumulative air quality.

Cumulative effects may be observed from additional development projects in the Norton Sound region. Any hard rock mineral development using marine transportation through the port of Nome may entail increased particulate emissions. Also hydrocarbon drilling operations in State waters of Norton Sound, onshore on Calista Corporation lands, or leasing and production of all predicted petroleum reserves in the Norton Sound Basin OCS may yield increased pollutant loads at particular locations.

Overall cumulative regional air quality impacts are expected to be moderate; local impacts will range from low to moderate. However, EPA rules associated with the Clean Air Act and the DOI air quality rules have provisions to minimize these impacts.

The proposal is not a significant contributor to the cumulative air quality impacts under either the most likely development case or the total development of all hydrocarbon resources in the planning area.

e) Recreation and Tourism: Very low impacts on visual and wilderness resources may occur from OCS operations offshore (3 platforms) of the Yukon Delta. No impacts in legislatively designated wilderness lands can be identified from this proposal. Minor impacts on recreational activities and facilities in the city of Nome are expected from any increase in population and attendent stress on existing facilities. There is a possibility of low level impacts on the Iditarod National Historic Trail and associated trail sites designated on the National Register of Historic Places. (See sale 57 FEIS for details on impacts and resources.) Recreation and tourism is not a major industry in the area, visitation is not expected to decrease as a result of OCS activity.

Conclusion: Overall recreation and tourism impacts in the area are expected to be low.

Cumulative Impacts. In the unlikely event that all areas of the Norton Basin planning area are leased and all resources subsequently are developed over the life of the proposal, the expected number of oilspills is 1.2 spills greater than 1,000 barrels and 0.5 spills greater than 10,000 barrels. An additional unknown quantity of oilspills is expected to result from tankering from Federal OCS lease sales in the planning area in the Arctic region as well as from development of State of Alaska territorial waters. Additional projects or activities that could contribute to cumulative impacts in the planning area are Canadian tankering, expansion of Port of Nome, and small commercial fisheries. These total projects or activities would effect recreation and tourism negatively by straining recreational resources. The cumulative impacts of these oilspill events, projects and activities are expected to produce low impact to recreation and tourism in the Norton planning area.

In the unlikely event that all resources in the planning area are leased and developed, the alternative contributes 75 percent of spills greater than 1,000 barrels and 80 percent of spills greater than 10,000 barrels caused by OCS activity in the planning area. When the tankering from other Federal OCS planning areas and State lease areas (to an unknown extent) are considered, the alternative contributes moderately to the cumualtive impacts. The most important causal agents for potential cumulative impacts on recreation and tourism is increased population pressure in the region not related to OCS development. The contribution of the alternative to cumulative impacts is considered to be insignificant when only the resources described for this alternative are developed. However, the contribution of the alternative is considered to be significant when all resources in the planning area are developed.

f) Socioeconomic Factors: The probability of the discovery of commercial quantities of petroleum resources in the Norton Basin OCS area is considered to be 57 percent, and the mean estimates of discoveries expected to result from the proposed 5-year leasing program are 200 million barrels of oil and 1.63 trillion cubic feet of natural gas.

Most petroleum workers in the area would live in isolated dormitories during work periods, and would commute during frequent rest periods to permanent residences in other regions of Alaska or out of state. Most in-state commuters would reside in the Anchorage region. The long-term employment impact resulting from the proposed 5-year leasing program would total about 400 jobs statewide, and the corresponding population impact would be about 800 new residents of Alaska.

Conclusion. With a commercial discovery, most of the impacts would occur in the form of 800 additional people in the State, most of which would reside in Anchorage. This potential increase in population for a city the size of Anchorage is considered to be insignificant. However, impacts would be low to moderate in the area depending on the local level of activity.

Cumulative Impacts. In the unlikely event that all areas of the Norton Basin planning area are leased and all resources subsequently are developed over the life of the proposal, the total cumulative impacts on resident employment and

population in the adjacent land area during the years 1980-2000 would probably be high in the sense that potentially significant short-term and minor long-term stress would be imposed on public and private services and facilities in the adjacent land area (Nome census division). These cumulative impacts include all anticipated non-OCS activities as well as all OCS activities, in this planning area, or in other planning areas, which are expected to have employment or population impacts in the land area adjacent to the Norton Basin OCS planning area.

Only modest increases in non-OCS economic activities are expected during the period 1980-2000. These include some increases in commercial fishing and the level of tourism activity. In addition, State of Alaska onshore or nearshore petroleum development is a possibility, as well as onshore petroleum development on lands owned by the Native Regional Corporation. However, little information is presently available concerning the probability of commercial success of these ventures. The available information indicates that if any of these prospects are developed commercially, the impacts would be small compared to the anticipated impacts from OCS developments in the area. Another possibility for increased economic activity is onshore or offshore development of hard minerals in the area. However, information is meager at this time concerning the probability that hard rock mineral development will occur in this area during the next 20 years; prospects appear to be good that such development will occur at some point in the future. Overall cumulative impacts to socioeconomic factors in the planning area are expected to be low to moderate. OCS activities in other planning areas are not expected to have significant employment or population impacts in the Nome census division. Anticipated OCS activities in this planning area, either at the mean expected resource development level or in the unlikely event of total development of all area resources, are expected to be significant and to account for most of the cumulative impacts. The impact of the proposal on the resident employment and population would be high in the sense that potentially significant short-term and minor long-term stress would be imposed on public and private services and facilities in the adjacent land area (Nome census division). This would be true either at the mean expected resource development level or in the unlikely event of total development of all area resources.

g) Impacts on Native Subsistence Cultures. This planning area is more thoroughly analyzed in the recently published FEIS for OCS Lease Sale 57. In 1980, population for this area was 9,292. This figure included the City of Nome (2,892), 18 villages in the Nome Census Division, and 6 Yukon Delta villages within Wade Hampton Census Division. Bering Strait villages are Siberian Yupik Eskimo. Norton Sound villages and Eskimos in Nome are primarily Inupiat Eskimo, and Yukon Delta villages belong to the Yupik Eskimo culture group. Native languages are retained throughout most of the planning area and traditional ways of life, including reliance on locally available food resources, is overwhelming. Spiritual ties to local land, water and wildlife are still strong; cooperative village-based hunting, fishing and gathering activities are the predominant organizing principles around which individual, family and village life are centered and organized. Bowhead whale, walrus and seals are the primary food source of Bering Strait villages, including Gambell, Savoonga and Diomede. These villages are tied through their whaling and other hunting traditions to other Inupiat hunting cultures, including the Inupiat of the North Slope, Canada and Greenland. Inner Norton

Sound and Yukon Delta villages are more dependent upon fish, particularly salmon for commercial and subsistence use. These villages also hunt walrus, seals and beluga whales and fish for a wide range of fish and shellfish in local waters. Processing facilities on the Yukon Delta and in the inner Norton Sound are important foci of employment and cash which help support subsistence harvesting activities.

Oilspill damage or other disturbances to local subsistence resources could both directly and indirectly effect subsistence villages dependent upon these resources. Direct effects would include diversion or displacement of subsistence efforts if migrating marine mammals, birds or fish altered their behavior in response to disturbances. Indirect effects would include alteration of the wilderness character of the area, social and cultural stress associated with shortages of customary and traditional resources in the places where they are usually found, and conflicts and competition over fish and game if sizable industrial workforce populations were allowed to hunt and fish in the area.

Oilspills statistically predicted for this planning are 0.9 equal to or greater than 1,000 barrels and 0.4 equal to or greater than 10,000 barrels. According to the OCS Lease Sale No. 57 FEIS, oilspill trajectories in this area put Bering Strait villages and resources at greater risk than inner Norton Sound or Yukon Delta villages. But since these villages are heavily dependent upon whales and other large sea mammals, the probability of oilspill damage sufficient to affect subsistence harvests is unlikely.

Conclusion. Because of the relatively low probabilities of discovering oil in this planning area and because of the diversity of locally available resources on which local villages depend for subsistence, regionally significant impacts are expected to be moderate for the Norton Basin planning area. This assessment takes into account dependence by Bering Strait villages on the endangered Bowhead whale.

Cumulative Impacts. In the unlikely event that all areas of the Norton planning area are leased and all resources subsequently are developed over the life of the proposal, the expected number of oilspills is 1.2 spills greater than 1,000 barrels and 0.5 spills greater than 10,000 barrels. An additional unknown quantity of oilspills is expected to result from tankering from Federal OCS lease sales in the Barrow Arch and Hope Basin areas and from the Canadian Beaufort as well as from development of State of Alaska territorial waters in Hope Basin and Norton Sound. Additional projects or activities that would contribute to cumulative impacts in the planning area are tankering through the Bering Strait, State and private onshore and nearshore leasing, activity induced by the improvement of the Port of Nome, and increased gold and hard rock mining in the area. These total projects or activities would effect Native subsistence cultures. Oilspill damage or other disturbances to local subsistence resources would divert, displace or reduce the availability of subsistence resources. Major disruption in the access to or availability of local subsistence resources where they were traditionally found could disrupt traditional subsistence effort patterns. Such disruptions would a) reduce subsistence catch of the resources customarily used, b) prevent the pursuit of subsistence practices by segments of the population due to the costs of using an increased subsistence range, c) disrupt traditional (cultural and spiritual patterns of obligation, d) impair fulfillment for kinship-based assistance

networks and care of the elderly and, e) induce chronic stress and anxiety over imbalances in nature, i.e. the fear of further changes in such relationships, and the inability to do anything about it. Impacts from such effects could include increased disease, malnutrition and mental disorders, family breakup and conflict, substance abuse and generational conflict. Localized impacts could be magnified within the region through the breakdown of customary inter-village (through family networks) resource distribution patterns and obligations. The cumulative impacts of these oilspill events, projects and activities are expected to produce a moderate to high impact on Native subsistence cultures in the Norton planning area.

In the unlikely event that all resources in the planning area are leased and developed, the alternative contributes 75 percent of spills greater than 1,000 barrels and 80 percent of spills greater than 10,000 barrels. These proportions are reduced moderatley when the tankering from other Federal OCS planning areas and State lease sale areas (to an unknown extent) are considered. Given these circumstances, the alternative contributes significantly to the total cumulative impact. Consequently, the most important causal agent for potential cumulative impacts on Native subsistence cultures is tankering from offshore and onshore oil development in the areas of the Beaufort and Chukchi Seas. The contribution of the alternative to cumulative impacts is minor in either the case of only the resources described as developed or all resources leased and developed in the planning area.

The cumulative impacts of these oilspill events, projects and activities are expected to produce a moderate to high impact on Native subsistence cultures in the Norton planning area.

3) Impacts on Other Management Plans:

Coastal Zone Management: With the exception of Nome (a first class city), and several native villages (ineligible to be funded) the entire adjacent shoreland to the Norton Basin sale area, including St. Lawrence Island, is in the unorganized borough. The Bering Strait Coastal Resource Service Area, has been formed, however. Formation of the CRSA allows the area to develop its own coastal plan.

An overall development strategy for the region is currently being drafted. Both Nome and Teller have, in the past, submitted applications for coastal energy impact program funding. The district program for the CRSA will not be completed in time for the proposed November 1982 sale, but will be completed by early 1984. The provisions of the ACMP will apply, however.

4) Unavoidable Adverse Impacts:

Oilspills, discharges or drilling effluents (muds, cuttings and formation waters) and sewage disposal would result in unavoidable adverse impacts to water quality under the proposal. Impacts from all of the above except oilspills could be mitigated by EPA NPDES regulation.

Water supply would be unavoidably adversely affected by this proposal. Limited supplies would be consumed by OCS-related infrastructure and development, creating demands on supplies of an unknown quantity.

The unavoidable adverse impact for land use would be a reduction in the amount of land available for other uses. Occupation of land by OCS-related activities and structures would be minimal.

Coastal ecosystems would be unavoidably adversely affected by oilspills and various discharges as mentioned above for water quality. The level of impact would be restricted both geographically and temporally.

The proposal would have unavoidable adverse impacts on fish by oilspills contacting nearshore habitats or eggs and larvae which occur on or near the surface. Oilspills would also affect commercial fishermen by reducing the number of harvestable fish. These impacts are expected to be minimal.

Birds, marine mammals and endangered species would also suffer unavoidable adverse impacts from oilspills. The level of impact would depend on when and where the oilspill occurred. Regional endangered species consultation with NMFS and FWS is required and would be conducted as needed.

Recreation and tourism resources could be adversely affected unavoidably by damage to visual resources through the intrusion of onshore support infrastructure and road systems, nearshore systems or causeways, pipelines and drilling islands, offshore oil and gas platforms, and vessel and aircraft traffic supporting such operations. Such effects would be localized and may serve as an attraction to a segment of the recreation and tourism population.

Cultural resources offshore, such as housepits, burins, scrapers, arrowheads and other artifacts, could be unavoidably destroyed through OCS operations; however the complex dynamics of the marine environment may already have resulted in the destruction of many of these resources. Cultural resources located onshore could be lost or damaged by public pilfering or indiscriminate exposure of artifact sites.

Introduction of urban and industrial land uses, except for regional urban centers, would change the character of isolated, de facto wilderness areas; however, impacts would be isolated and small in relation to the total area involved. Where urban centers are involved, land use demands generated by OCS activities could unavoidably produce adverse effects derived from the rate and relative scale of demand. Land speculation and price inflation would be expected as well as interruptions in community facilities and infrastructure during the period necessary for such aspects of land development to catch up with increased land use demands.

Native subsistence cultures would be adversely affected directly in an unavoidably way through accidental oilspills and an increase in population; both of which are causal agents which would effect the access to and availability of subsistence resources. Such impacts have been discussed previously. Localized effects in villages could have adverse effects throughout the village region. Disruption of customary urban-village migration patterns, through effects such as urban housing shortages, price inflation or reduced supply of public services, would cause hardship for those segments of the population unable or unwilling to adapt to such changes and contribute to social disorder and disorientation of cultural value system.

5) Relationship Between Local Short-Term Uses and Maintenance and Enhancement of Long-Term Productivity: In this section, the short-term effects and uses of various components of the environment are related to long-term effects and the maintenance and enhancement of long-term productivity. The effect of the alternatives would vary in kind, intensity, and duration, beginning with preparatory activities (seismic data collection and exploration drilling) of oil and gas development, and ending when natural environmental balances might be restored.

Biological productivity would be lost in the short-term on all onshore lands used in the proposed project. These areas could be returned to productivity in the long-term with proper management. Restoration may not be entirely feasible; however, the overall loss would be a minor adverse effect. Direct land requirements would be expected in both the short-term and the long-term as a result of OCS activities. Major construction projects would cause definite changes in both the short-term and long-term. Some species may have difficulty repopulating and could be displaced.

Short-term oil pollution and the possibility of long-term cumulative oil pollution impacts would cause serious adverse effects on all components of the marine ecosystem, including fisheries. While restoration would allow fisheries production to regain original levels, any reduced annual harvests during the life of the project would be irretrievably lost. The extent is not known presently, but the potential must be recognized.

Freshwater pollution from onshore activities is a short-term effect. The long-term decrease in water quality may be considered to be a tradeoff for obtaining oil and gas resources.

The biota would be threatened in the short-term by potential oil pollution. Direct mortality would be significant through the combined effects of harassment by humans and the increased volume and frequency of noise from vessel traffic or overflying aircraft. In the long-term, such disturbances would alter behavior patterns and would drive fauna away from traditional feeding and breeding grounds or to other critical areas within their range, reducing species populations over a long period of time.

Habitat destruction would cause a reduction in subsistence species which would threaten the regional economy. The improved accessibility to primitive areas from increased construction is a short-term result of this alternative. The overall wilderness value of the coast may decrease from increased land use. Increased human populations in the short-term would change the regional Native culture in the long-term. The subsistence way of life would be modified and population shifts would occur. The overall changes cannot be termed positive or negative, except by those affected.

Archaeological and historic values discovered during development would enhance long-term knowledge. Overall, finds may help to locate other sites, but destruction of artifacts would represent long-term losses.

Consumption of offshore oil and gas would be a long-term use of non-renewable resources. Economic, political, and social benefits may accrue from the availability of oil and gas. Most benefits would be short-term and would decrease the nation's dependency on oil imports.

The production of oil and gas from the planning area would provide short-term, critically needed energy, and perhaps, provide time either for the development of long-term alternative energy sources or subsistences for petroleum feedstocks. Petroleum development in these areas may mean the irreplaceable loss of some fisheries production. The maintenance and enhancement of long-term productivity would depend on efforts to control water quality levels. Regional planning would aid in controlling changing economics and populations, and thus, in moderating any adverse impacts.

6) Irreversible and Irretrievable Commitment of Resources

a) Minerals Resources: Resources discovered would be irretrievably consumed.

b) Social Systems: Lifestyle elements could be lost if full-scale development of OCS oil and gas resources occurs, and if enclave or modified conditions are not maintained. Irretrievalbe loss of customary and traditional renewable resources would significantly damage the social and economic fabric of village life in villages if access to fish and game was unrestricted, while significant growth of local human populations occurred with full development.

Lack of consideration by incoming OCS populations for traditional Eskimo culture and lifestyle may mean irretrievable loss of behavior patterns and their associated material products. Such products include baskets, amulets, face masks, and certain subsistence tools all of which are the result of traditional behavior patterns. Other irretrievable material products of past cultures such as archaeological remains may be lost through looting of sites and discriminate or accidental trespassing on known and unknown sites.

Inflated living expenses would cause residents to spend greater percentages of expendable income on basic necessities, thereby foregoing the possibilities of a higher quality of life.

c) Biological Resouces: Commerical fishery losses may occur in several ways. For example, if the nearshore areas are contaminated, salmon, herring, and king crab may avoid the areas in which salmon and herring are harvested. Any losses of commercial fishing incomes attributable to this alternative would be irreversible and irretrievable. Unharvested commercial finfish and shellfish, as renewable resources, would be irretrievably lost to the economy.

General industry activities, such as increased ship traffic, aircraft noise, and land-based activiteis, could displace marine and terrestrial birds and mammals into less favorable environments, which would eventually result in reduced population levels. This displacement could become irretrievable if permanent alterations to the environment and habitat were maintained by man.

d) Endangered Species: Under the proposal, it is possible that endangered whales would be subjected to irreversible direct and indirect effects of oilspills, disturbance due to noise and other human activities, or losses and/or deterioration of habitat due to facility developments. Whether such effects would lead to permanent (irreversible) losses of whale resources is unknown.

THE MORE SIGNIFICANT ENVIRONMENTAL CONSEQUENCES

Norton

Resource Category	Level of Expected Impacts* Scheduled Sales Only Under Alternative I-1	Cumulative Impacts of All Activities
1. General Impacts		
a. Coastal Ecosystems	low	moderate to high
b. Water Quality and Supply		
Water Quality	low	moderate
Water Supply	high to very high	very high
c. Navigation and Shipping	very low	low
d. Other Uses of the OCS	n/a	n/a
e. Land Use	moderate	moderate
f. Cultural Resources	low to moderate	moderate
2. Impacts of Special Concern		
a. Fish and Commercial Fisheries		
Fish Resources	low	moderate
Commercial Fisheries	low	moderate
b. Endangered Species		
Cetaceans	low	moderate to high
Birds	low	low
c. Habitats and Resources of Special Concern		
Birds	moderate	high
Mammals	moderate	moderate to high
d. Air Quality	low	moderate
e. Recreation and Tourism	low to moderate	moderate
f. Socioeconomic Factors	low to moderate	low to moderate
g. Native Subsistence Cultures	moderate	moderate to high

* Definitions of level of impact are provided at the beginning of Section V.D.

(This table also applies to Alternatives I-2, II, III-1, III-2, IV-1, and IV-2. See text.)

e) Economic Factors: The only commitment that could possibly be considered irreversible and irretrievable would be the economic risk, of destruction of fisheries resources or destruction of other fauna and flora used for subsistence by area residents, as a result of OCS activities.

b. Alternative I-2

Resource estimates and attendant activities, and oilspill probabilities are the same for this alternative as for Alternative I-1. This being the case, impacts including cumulative impacts, resulting from this alternative would be the same as those described for Alternative I-1. Cumulative impacts are the same for all alternatives as total development of resources (eventually) was assumed in all cases. In situations where the resource estimates are different from the proposal, the contribution of the alternative to the cumulative impacts will vary, but the cumulative impacts remain as stated in Alternative I-1.

c. Alternative II

The impacts from this alternative in Norton Basin planning area are identical to those described in Alternative I-1 as the resource estimates, infrastructure requirements, and expected number of oil spills are the same.

d. Alternative III-1

The level of expected impacts following the adoption of Alternative III-1 does not differ significantly from Alternative I-1, although the resource estimates and expected oilspills are lower than the proposal. The estimated hydrocarbon resources under Alternative III-1 is 140 million barrels of oil and 1.09 trillion cubic feet of gas (vs. 200 million barrels of oil and 1.63 trillion cubic feet of gas for the proposal). Thirty-six exploration and development/production wells and one platform are expected (vs. 61 wells and three platforms for the proposal). The expected number of oilspills greater than 1,000 is 0.6 for this alternative (vs. 0.9) and 0.3 for spills greater than 10,000 (vs. 0.4). This is between a 30-40 percent reduction in activity and spill effects. Although the resources are lower, the level of impact for each resource is not expected to be significantly different from those described in the proposal.

e. Alternative III-2

Impacts from this alternative in the Norton Basin planning area are identical to those described in the proposal as the resource estimates, infrastructure requirements, and expected oilspills are identical to those for the proposal.

f. Alternative IV-1.a

Resource estimates and attendent activities, and oilspill probabilities are slightly less for this alternative as for Alternative I-1. Conditional mean resource estimates for this alternative are 180 million barrels of oil and 1.24 TCF of gas (vs. 200 million barrels and 1.63 TCF for the proposal). Fifteen wells are required for this alternative and two platforms (vs. 62 wells and three platforms for the proposal). However, impacts resulting from this alternative would not significantly different from those described for Alternative I-1.

Thus, potential cumulative impacts could be reduced slightly with this alternative compared to Alternative I-1.

g. Alternative IV-1.b.

Impacts from this alternative are identical to those described above for Alternative IV-1.a/

h. Alternative IV-2.a.

Impacts from this alternative are identical in this planning area to those described for the proposal as the resource estimates in this planning area, infrastructure requirements, and expected number of oilspills are as described in the alternative.

i. Alternative IV-2.b.

Impacts from this alternative are identical in this planning area to those described for the proposal as the resource estimates in this planning area, infrastructure requirements, and expected number of oilspills are as described in the alternative.

18. Hope Basin

a. Alternative I

1) General Impacts

a) Coastal Ecosystems: Most of the shoreline surrounding Kotzebue Sound, (Bering Land Bridge National Preserve, Selamch NWR, Cape Krusenstern National Monument) is designated in the national interest lands conservation system. These areas are protected, because of their abundance of wildlife and archaeological significance. Significant concentrations of birds exist in colonies all along the south shore of Kotzebue Sound, on the southern portion of Baldwin Peninsula, and Sheshalik Spit and Krusenstern Lagoon. Caribou and moose are in the area and are used as subsistence resources, as are marine mammals, including whales.

Populations of fish, birds, and marine mammals could be moderately affected by noise and pollutant events affecting coastal breeding and feeding areas. These types of impacts would likely occur during development activity. Additional detail is provided in Section V.D.18.a.2)c), habitats and resources of special concern.

Over the life of the proposal 0.2 oilspills greater than 1,000 barrels and 0.1 oilspills greater than 10,000 barrels are expected to occur. Given this extremely low number of spills, it is very unlikely than any of the coastal ecosystems would be contacted by an oilspill. The expected level of impact is very low.

Conclusion. The expected level of impact to the coastal ecosystems of the Hope Basin planning area is very low.

Cumulative Impacts. In the unlikely event that all areas of the Hope Basin planning area are leased and all resources subsequently are developed over the life of the proposal, the expected number of oilspills is 0.3 spills greater than 1,000 barrels and 0.1 spills greater than 10,000 barrels. An additional unknown quantity of oilspills is expected to result from tankering from Federal OCS lease sales in the Barrow Arch planning area and from development of State of Alaska territorial waters in Hope Basin as well as from the Canadian Beaufort. These total projects or activities could affect coastal ecosystems by increasing the risk of oilspills. The cumulative impacts of these oilspill events, projects and activities are expected to produce a low impact to these coastal ecosystems in the Hope Basin planning area.

In the unlikely case of all resources in the planning area leased and developed, the alternative contributes less than 67 percent of spills greater than 1,000 barrels. The alternative contributes moderately to the total cumulative case. The most important causal agent for potential cumulative impacts on coastal ecosystems is the proposed State of Alaska Hope Basin Sale, because of its close proximity to the affected habitats.

The contribution of the alternative to cumulative impacts is moderate in either the case of only the resources described as developed or all resources leased and developed in the planning area.

b) Water Quality and Supply:

Water Quality: Onshore impacts to water quality would be similar to those discussed for Norton Sound.

Offshore water quality in the Hope Basin is pristine. If expected commercial quantities of oil and gas occur, 45 million barrels of formation water would be produced. The expected number of oilspills associated with development are 0.2 of 1,000 barrels or more including 0.1 of 10,000 barrels or greater. Over the years of exploratory and developmental drilling, 3,000 cubic yards of drill cuttings and 9,000 barrels of drilling mud will be discharged. These discharges would decrease short-term water clarity over 0.03 percent of the basin. If formation waters were discharged, they would release the equivalent of 15,000 barrels of oil into basin wastes as dissolved hydrocarbons. The major impact would be a slight chronic oiling of basin waters and reductions in water clarity near drilling structures.

Water Supply: Development of the hydrocarbons described under the proposal assumes the siting of an enclave at Kozebue Sound to provide infrastructure for the development of the resources and housing for employees. New water supply facilities will have to be constructed to serve the enclave as existing supplies are not adequate to serve both the existing and new populations. Thus, the expected impact on water supply is very high.

Conclusions. The effects on water quality from OCS activity in this area will be low, except in the immediate vicinity of platforms. There are few developed water systems to support OCS activity, so new water supplies would have to be developed resulting in a very high level of impact.

Cumulative Impacts. In the unlikely event that all potential oil and gas resources of the Hope Basin planning area are leased and subsequently developed in a timely manner, the expected number oilspills is 0.3 spills of 1,000 barrels or more with 0.1 spills of at least 10,000 barrels. An additional unknown quantity of oilspills is expected to result from tankering from Federal OCS lease sales in Barrow Arch planning area. An additional unknown number of oilspills could occur from development of State of Alaska onshore and offshore reserves in Hope Basin area, from development of Native Corporation onshore reserves in the Hope Basin area, and tankering of Canadian Beaufort Sea crude. Oil industry development of all gas and oil reserves in the Hope Basin planning area would result in discharge of 4,800 cubic yards of drill cuttings and 14,400 barrels of drilling mud during drilling phases. Formation waters produced would total 70 million barrels over the life of the field. Increased commercial traffic and construction of gravel drilling islands from which to drill would contribute to cumulative impacts in the planning area by increasing local turbidity and increasing risk of fuel spills. The cumulative impacts of these oilspill events, discharges, and additional traffic are expected to produce a moderate impact to water quality in the planning area.

In the unlikely event that all resources in the planning area are leased and developed, in the Hope Basin planning area, this alternative would contribute 67 percent of spills of 1,000 barrels or more. This alternative would provide 62 percent of cumulative impact to the planning area from drill cuttings, 62 percent of the impact from drilling mud, and 62 percent of the impact from formation waters. The greatest threat to Hope Basin water quality is from oil

pollution related to spills associated with transporting Canadian Beaufort and State crude through the Hope Basin. The Hope Basin planning area in this alternative contributes very slightly to the total cumulative impacts in the planning area both in the case of only the resources described in the proposal and in the case in which all resources and leased and developed in the planning area.

If all potential oil and gas resources of the Hope Basin planning area were leased and developed, new water supply facilities would be required, causing very high impact. Other cumulative impacts are expected from State and private onshore and offshore oil leasing, increased commercial activity, and onshore Federal oil leasing. The sum effect of these additional impacts is likely to be very high. If enclaving occurs and water supplies are developed for the enclave, the contribution of OCS development in the region to cumulative impacts on water supply is major. It would be a significant contributor in every case where the enclave is located in or near an existing settlement with already taxed water supplies.

c) Navigation: The area compromising the Hope Basin is one which is only sparsely traversed by ocean-going vessels (most of which are bound for Prudhoe Bay). The siting of one platform as a result of the proposed action is unlikely to have any impact on navigation. Given the forecast resources of the proposed Hope Basin sale, it is unlikely that any traffic resulting from the proposed sale will be significant.

Conclusion. The probability of impacts to navigation is very low.

Cumulative Impacts. Vessel traffic transiting the waters in the Hope Basin will be derived from traffic which is bound for Prudhoe Bay, Chukchi and Beaufort Seas; this includes a modest local fishing fleet and hydrocarbon tankering from Canada. Vessel traffic generated by OCS development within the Hope Basin under either the cumulative or mean resource case will be almost negligible; Hope Basin OCS activities would constitute less than five percent of all traffic. Impacts for both cases would have to be considered to be very low.

d) Other Uses of the OCS: The main uses of the area are for subsistence hunting and fishing, discussed in Section V.D.10.a.2)g).

e) Land Use: Except for Kotzebue, there is no major infrastructure in the area. It is assumed that facilities built around Kotzebue Sound for oil and gas development would be of an enclave nature. This should eliminate widespread land use impacts, containing them locally to the area of and surrounding the enclave. Thus development is expected to encompass 65 acres of land (for a small support facility and terminal site).

Conclusion. Since this area is mainly undeveloped, land use impact will be moderate to high.

Cumulative Impacts. Other projects that will affect land use in the Hope Basin area are tankering and commercial traffic and state oil and gas leasing. These will not affect land use to an appreciable extent as most State oil and gas leasing is expected to be handled out of existing facilities.

Land use impacts from the total development of the resources in the planning area would affect 90 acres of land because of the need for a supply base and a terminal facility. Maximum resource development would result in significant changes in land use. The expected level of cumulative impact to land use is expected to be moderate to high.

f) Cultural Resources: In the Hope Basin adverse impacts may occur to onshore sites as a result of exploration and development of oil and accidents associated with such activities. Particularly vulnerable to impact are shore sites such as Cape Krusenstern. Villages such as Shismaref, Point Hope, and Kivalina are still located in areas that have been strategic whaling camps for centuries. Adverse impacts to the historic buildings and other places and objects are likely without protective measures.

Conclusions. The overall effect of OCS activity on cultural resources is low to moderate, depending on the extent of any coastal OCS facilities, as several known and suspected resource sites exist in the area.

Cumulative Impacts. In the unlikely event that all areas of the Hope planning area are leased and all resources subsequently developed over the life of the proposal, the expected number of oilspills is 0.3 spills greater than 1,000 barrels with 0.1 spills greater than 10,000 barrels. An additional unknown number of oilspills are expected to result from tankering from Federal OCS lease sales in the Barrow Arch planning areas, tankering from the Canadian Beaufort, and from development of State of Alaska territorial waters in Hope and Beaufort. These total projects or activities could affect cultural resources by oiling of artifacts and onshore development of facilities. The cumulative impacts of these oilspill events, projects, and activities are expected to produce a moderate impact to cultural resources in the Hope planning area.

In the unlikely event of all resources in the planning area leased and developed, the alternative contributes less than 67 percent of spills greater than 1,000 barrels to the cumulative impacts caused by spills. The most important causal agents for potential impacts on cultural resources are tankering from other lease sales and onshore facility development. The contribution of the alternative to cumulative impacts is minor whether considering only the oil and gas resources described in the proposal or considering the development of all oil and gas resources in the planning area.

2) Impacts of Special Concern

a) Commercial Fisheries

(1) Important Fish Resources

The important commercial and subsistence fishery resources of the Hope Basin planning area are pink and chum salmon, herring, inconnu, and several white-fish species. Impacts to these resources would result from accidental oilspills. Over the life of the proposal, 0.2 oilspills greater than 1,000 barrels including 0.1 oilspills greater than 10,000 barrels are expected. Oilspills can impact fish populations by causing short-term sublethal impacts. In this planning area, those species that are most vulnerable are pink and chum salmon (all life stages), and inconnu and

whitefish (adults). Herring in this region spawn primarily in the sheltered waters of Lmurak Basin and therefore, would not be subject to impacts by oilspills.

Whitefish and inconnu are anadromous species that occupy nearshore coastal waters primarily as adults. Because of the very low number of expected spills and the broad distribution of these species throughout the nearshore zone, impacts to regional populations would be very low.

Adult salmon would be vulnerable to oil contamination if a spill contacted areas in or near the mouths of rivers during or preceding periods when these fish are congregating near these river mouths prior to migrating up river to spawn. Smolt would be susceptible to adverse impacts in the same areas during out-migration or in nearshore areas during their first few months in the marine environment. Pink and chum salmon would be vulnerable during all life stages as these species spawn intertidally to some degree. Vulnerability would vary depending on the timing of the spawning or out-migration of a particular population or run. The five adult species in the planning area exhibit a period of vulnerability (spawning period) of approximately three to four weeks. This period of vulnerability occurs from May to September. Little is known about movements of juvenile salmon. They make coastwide movements (lateral to shore), feed and grow in the intertidal, and move offshore over a period of several months.

If it is assumed that an oilspill contacts a nearshore area, especially off the mouth of a salmon stream, several impacts could occur. These impacts could be any of a variety of lethal or sublethal toxic responses, or the loss of fish prey organisms. Adult salmon are highly mobile, and some evidence suggests that this life stage could detect and avoid toxic levels of aromatic hydrocarbons in solution (Weber et al., 1981). Therefore, the major concern seems to be that these adults would avoid areas of contamination, which if found off the mouths of major spawning rivers could result in delays in spawning runs or actual blockage of the river or stream. Given the fact that oilspills in the marine environment generally result in concentrations less than those which have proven toxic to adult salmon (Malins, 1977), it is quite unlikely that this type of impact would occur. Even if toxic concentrations did occur, these concentrations would not remain long in marine waters, especially off the mouth of major rivers where dilution would occur rapidly.

Salmon smolt on the other hand would perhaps be more vulnerable, in that they would remain in nearshore waters for longer periods while they feed and grow in preparation of movements farther offshore. However, like adult salmon, juveniles appear to possess the ability to detect toxic concentrations of petroleum hydrocarbons (Maynard et al., 1981). If this is the case, then oilspills in the nearshore could possibly be avoided to some degree by this life stage. Additionally, as stated above, toxic concentrations in the range of concern (5-15 parts per million [Maynard et al., 1981] of aromatic hydrocarbons) would not be expected in marine waters. However, considering that a spill could remain several days or several weeks in coastal waters, portions of a population may be subject to prolonged stress from sublethal effects.

The eggs and larvae of pink and chum salmon that occur in marine intertidal areas would be the most vulnerable of these earlier life stages. It would be

difficult to quantify the impacts to a local salmon fishery from oilspill contamination in a spawning or larval rearing area. However, it is possible that a large portion of eggs and larvae could be lost. The gravity of this loss, however, becomes somewhat obscure when one consideres that natural mortality of eggs and larvae may be as high as 75 percent of each of these life stages. The difficulty would be in ascertaining what percentage of those lost from oil pollution would have succumbed naturally. It is possible that most of a year class from local population could be lost. When considering the large annual fluctuations in these species, however, this may not always be significant. Generally though, a year class lost is not a desirable effect as it can significantly reduce later year population levels.

Given the extremely low number of expected spills, and the narrow periods of vulnerability at least for adult and juvenile salmon, it is unlikely that an oilspill would contact important nearshore areas during the period when salmon are present. The level of impact to a local pink or chum population could be moderate as a result of oil contacting an important spawning and larval rearing intertidal area. Regional impacts on pink or chum salmon would be very low.

Conclusions. Impacts on fish resources of Hope Basin are expected to be very low.

Cumulative Impacts. If all areas of the Hope Basin planning area are leased and all resources subsequently developed during the life of the proposal, the expected number of oilspills is 0.3 spills greater than 1,000 barrels with 0.1 spills greater than 10,000 barrels. In addition, an unknown number of oilspills are expected to result from tankering of oil from the proposed Barrow Arch leases and the Canadian Beaufort. An unknown number of spills are also expected to occur from development of the proposed State of Alaska lease sale in Hope Basin (No. 45).

The cumulative effect of these oilspills is expected to result in low ecological impacts to fish resoruces. The contribution of the proposal to the cumulative case would be low for oilspills greater than 1,000 and 10,000 barrels. This would apply when only the resources described in the proposal are developed or all the resources in the planning area are developed.

(2) Commercial Fisheries: The Hope Basin commercial salmon fishery, existing primarily in Kotzebue Sound, is a minor fishery when compared to the other salmon fisheries of western Alaska. In 1979, over 1.2 million pounds of salmon (mainly pink and chum) worth about $1.1 million to local fishermen were landed in the region (Terry et al., 1981). This represents less than 0.2 percent of the total Alaska landings. However, the commercial fishery is a major source of income to the people of the region.

Impacts on the commercial fishery of Kotzebue Sound are likely to result from ocean space use conflicts (damage/loss to gear and disruption of fishing activites due to oilspills) and loss of resources. These types of impacts have been discussed thoroughly in previous sections (See Section V.D.17.a.2)a)(2)).

Since the expected level of OCS activity in this planning area is extremely low, impacts to commercial fishing from space use conflicts is very low. Further, since ecological losses are expected to be very low, loss of harvestable resources (salmon) is expected to be very low.

Conclusions. As a result of the proposal, the expected level of impact on commercial fishing in the Hope Basin planning area is very low.

Cumulative Impacts. Cumulative impacts would result from full development of resources within the planning area, tankering of oil from the proposed Barrow Arch leases and the Canadian Beaufort, and the proposed State sale in Hope Basin. Oilspills would increase, as stated previously, (see section V.D.18.a.2)a)(1)) and result in a low ecological loss to fish resoruces, which would yield a low economic loss to regional fishermen. The contribution of the proposal, whether total development of hydrocarbon resources on the area is considered or not, is small.

b) Endangered Species: Endangered whale species that occur commonly and seasonally within the Hope Basin planning area are the bowhead whale and gray whale. Other endangered cetaceans that are uncommon or occur in very low numbers in this area are the fin, humpback, and sei whales. An endangered bird species, the peregrine falcon, occurs along the coast of the Hope Basin planning area. The potential effects of oil and gas exploration and development on endangered species would come primarily from oil pollution and noise disturbance.

The endangered cetacean species most likely to be affected by oil and gas activities in the Hope Basin planning area are the bowhead whale and the gray whale. The other endangered whale species are either such infrequent seasonal visitors or occur seasonally in such very low numbers that it is very unlikely that these species would be affected by OCS activities in the area. However, because the Hope Basin is part of the migration route of the bowhead whale and part of the arctic feeding habitat of a sizable number of gray whales, endangered species are considered high in sensitivity to oil and gas activities in the Hope Basin.

Peregrine falcon nesting sites may to occur at Krusenstern Lagoon and Cape Thompson and Cape Lisbourne along the coast of the planning area. The factor most likely to affect peregrine falcon would be effects associated with aircraft noise and disturbance, especially that associated with supply aircraft serving offshore facilities and potentially passing close to nesting sites. Disturbance from such sources could reduce the survival of nestlings. Construction of onshore facilities near peregrine nesting sites could also be a potential source of disturbance. Oilspills could also be a factor if substantial reduction in local prey species (marine birds) occurs near a peregrine nesting site. At the time of this writing a revised biological opinion from NMFS is pending. The previous biological opinion, received June 1980, stated that DOI cannot at this time insure that all oil and gas activities which may result from lease sales in the arctic are not likely to jeopardize the continued existence of the bowhead. However, if the reasonable and prudent alternatives suggested in the biological opinion are adopted, activities associated with pre-exploration and exploration stages would not be likely to jeopardize the continued existence of the bowhead whale.

Conclusions. Based on the particular importance of the Hope Basin planning area to the endangered bowhead whale and the use of this habitat area by the gray whale and peregrine falcon, endangered species are expected to sustain moderate losses from oil and gas activities in the planning area.

Cumulative Impacts. In the unlikely event that all areas of the Hope planning area are leased and all resources subsequently are developed over the life of the proposal, the expected number of oilspills is 0.3 spills greater than 1,000 barrels including 0.1 spills greater than 10,000 barrels. An additional unknown quantity of oilspills is expected to result from tankering from Federal and Canadian lease sales in the arctic as well as from development of State of Alaska territorial waters along the Hope Basin coast. Additional projects or activities that could contribute to cumulative impacts in the planning area are commercial traffic. These total projects or activities could affect endangered whales through oilspills, disturbance, and reduction in habitat quality. The cumulative impacts of these oilspill events, projects, and activities are expected to produce a moderate to high impact to endangered whales and low to moderate impact on endangered birds in the Hope Basin planning area.

In the unlikely event that all resources in the planning area are leased and developed, the alternative contributes less than 67 percent of spills greater than 1,000 barrels. The most important causal agent for potential cumulative impacts on endangered whales is tankering from other Federal lease sales and Canadian Beaufort development. The most important causal agent for potential cumulative impacts on endangered birds is development of onshore lease sales. The contribution of leasing in Hope Basin under this alternative to cumulative impacts is minor in both the case of only the resources described in the proposal and in the case of total development of the resources in the planning area.

c) Habitats and Resources of Special Concern: Most of the Pacific walrus population migrates through Hope Basin during the spring and fall while part of the herd feeds within the area. Sizeable populations of ringed, bearded, and spotted seals also occur in this planning unit while a large population (400,000) seabirds, 90 percent of which are highly vulnerable to oilspills, is also present in the area. Habitats of special concern for the above species in the Hope planning area are the Bering Strait, the only migration corridor for marine mammals and marine birds migrating to and from the arctic, marine waters near Cape Thompson and marine waters near Chamisco-Puffin Islands in Kotzebue Sound. The waters near the Sound serve as a foraging habitat for vulnerable seabirds.

The major adverse impacts of OCS activities of the proposal could come from oil pollution of the marine environment and man-made disturbance. The species most likely to be signficantly affected by the potential effects of OCS oil and gas activities in the Hope Basin planning area are diving seabirds, especially if an oilspill occurs near Cape Thompson or within Kotzebue Sound. Ringed seals could be disturbed by seismic activities occurring on the shorefast ice during the pupping season leading to displacement from favorable habitat and reduction in annual productivity. Migratory waterfowl and shorebirds may be affected if an oilspill reaches coastal habitats along Kotzebue Sound or within Ikpek Lagoon and Shishmaref Inlet. Walrus and other marine mammals could be adversely affected if, 1) an oilspill covers ice leads during the spring, hindering their spring migration and, 2) oil pollution effects their benthic food source.

Conclusions. Marine mammals and birds and their habitats of special concern would be moderately impacted by OCS oil and gas activities in Hope Basin as described under the proposal.

Cumulative Impacts. In the unlikely event that all areas of the Hope planning area are leased and all resources subsequently are developed over the life of the proposal, the expected number of oilspills is 0.3 spills greater than 1,000 barrels, 0.1 spills greater than 10,000 barrels. An additional unknown quantity of oilspills is expected to result from tankering from Canadian lease sales and Federal OCS lease sales in the Barrow Arch planning area as well as from development of State of Alaska territorial waters in Hope Basin. Additional projects or activities that could contribute to cumulative impacts in the planning area are commercial traffic and Canadian OCS activities. These total projects or activities could affect marine mammals and birds in the following ways: oil spills, disturbance, and reduction in habitat quality. The cumulative impacts of these oilspill events, projects, and activities are expected to produce a moderate to high impact to marine mammals and birds in the Hope planning area.

In the unlikely event that all resources in the planning are area leased and developed, the alternative contributes less than 67 percent of spills greater than 1,000 barrels. The most important causal agents for potential cumulative impacts on marine mammals are seismic and other disturbances from arctic Federal, State, and Canadian lease sales. The most important causal agent for cumulative impacts on birds is tankering of oil from other Federal leases and the Canadian Beaufort. The contribution of the alternative to cumulative impacts is significant in the case of only the resources described in the proposal being developed as well as in the case of total development of hydrocarbon resources in the planning area.

d) Air Quality: A discussion of the primary factors used in assessing onshore air quality impacts which may result from OCS-related activities and the method employed in quantifying the impact on the planning area are described in Section V.A.3 of this document.

It is estimated that six exploratory wells will be drilled to identify the resources and nine development/production wells and one platform to develop the resources under this alternative. It was assumed, for the purposes of analysis, that production from an average platform would be 3.3 million barrels of oil and 26.7 billion cubic feet of gas per year. The hydrocarbons are expected to be transported to shore via subsea pipeline and then by tanker to outside the region. Estimated representative emissions for exploration/development are provided in Table V.D.18.a.2)d)-1. This information is derived from Table V.A.3-1.

Table V.D.18.a.2)d)-1. Estimated Representation Emissions

Activity	Production at Platform (tons per year)				
	VOC	NO_x	TSP	SO_2	CO
oil/gas	27	396	n/a	0.05	150
barging	none	-	-	-	-

OCS facilities located within 20 miles of shore require emission controls. However, the platform projected for the extraction of resources under the proposal is expected to be located beyond 20 miles and thus, does not need controls. No new refineries or gas processing plants are anticipated for the development of the resources.

A very low qualitative impact is expected from routine emissions. The area is in attainment for all pollutants; no new major onshore pollutant sources are forecast, and because of distance from shore, offshore development will not impact onshore areas. Because development will be well offshore, blowouts, oilspills, and fires would likely not impact the onshore air quality unless the event lasted for several days.

Any emission sources which would adversely affect the onshore air quality would be subject to mitigation required by EPA and the State, if located onshore, or by DOI, if located on the OCS. ERG (1981) discusses mitigation measures for OCS facilities.

Conclusions. The level of expected impacts from the proposal is very low.

Cumulative Impacts. It is estimated that a total of 0.07 billion barrels of oil and 1.2 trillion cubic feet of gas exist in the entire Hope Basin Federal OCS planning area. In the event that total development of all Federal reserves occurs over the life of this proposal, one new platform with 14 wells would be required.

The major influencing factors affecting the onshore air quality near the planning area as a result of this development are 1) the number of new wells drilled, 2) the location of the platforms, 3) the timing of the activities, and 4) the instantaneous local meteorological conditions. The offshore development of this proposal contributes significantly to regional cumulative air quality associated with OCS development. If a processing facility is sited in the area, low level impacts will occur. OCS development is the only contributor to this.

Other contributors to air pollutant concentrations in the planning area are possibly the tankering of Canadian crude through the area and State leasing. This contribution is insignificant.

The OCS development is a major contributor to potential air pollutant concentration changes in the region. However, no significant changes are expected under either the proposal or for total development of resources in the area.

Overall, the level of expected impacts is low. Nearshore state hydrocarbon development and any new gas processing plant will not significantly add to this.

e) Recreation and Tourism: Visual, wilderness, and recreational values will be adversely affected to some degree by exploration and development activity particularly in the Cape Krusenstern National Monument area. Particularly sensitive to impacts are the beach ridges at Cape Krusenstern which can be seen from aircraft. These are the prehistoric-occupied shores of the Chukchi Sea in which homes and fish camps of past people have been found. Kotzebue is a stop for major tourist routes in the area. From there, trips are taken up the Noatak River to hunt moose and other game, and to Kivalina and Pt. Hope, the whaling villages of the Chukchi. Primitive values will be adversely affected if exploratory and development facilities cause population increases outside an enclave.

Conclusions. Impacts on recreation and tourism from OCS oil and gas development will be low.

Cumulative Impacts. In the unlikely event that all areas of the Hope planning area are leased and all resources subsequently are developed over the life of the proposal, the expected number of oilspills is 0.3 spills greater than 1,000 barrels including 0.1 spills greater than 10,000 barrels. An additional unknown quantity of oilspills is expected to result from tankering from Federal OCS lease sales in the Barrow Arch and from the Canadian Beaufort. An additional unknown number of oilspills could also occur from development of State of Alaska territorial waters in Hope and Beaufort. These total projects or activities would not affect recreation and tourism. The cumulative impacts of these oilspill events, projects, and activities are expected to produce a moderate impact to recreation and tourism in the Hope planning area.

In the unlikely event that all resources in the planning area are leased and developed, the alternative contributes less than 67 percent of spills greater than 1,000 barrels. The most important causal agent for potential cumulative impacts on recreation and tourism is tankering from other lease sales. The contribution of the alternative to cumulative impacts is moderate in the case of only the oil and gas resources described in the proposal are developed and is minor in the case of all oil and gas resources leased and developed in the planning areas.

f) Socioeconomic Factors: The probability of the discovery of commercial quantities of petroleum resources in the Hope Basin OCS area is considered to be 24 percent, and the mean estimates of discoveries expected to result from the proposed 5-year leasing program are 50 million barrels of oil and 0.83 trillion cubic feet of natural gas.

Most petroleum workers in the area would live in isolated dormitories during work periods, and would commute during frequent rest periods to permanent residences in other regions of Alaska or out of state. Most in-state commuters would reside in the Anchorage region. The long-term employment impact resulting from the proposal for development of the planning area including all indirect employment effects would total about 100 jobs statewide, and the population impact would be about 200 new residents.

Conclusions. Given a commercial discovery most of the impacts would occur in the form of 200 new residents in the State; most of these new residents in would reside Anchorage, a city which would be able to handle the increase in population. The level of expected impacts would be low.

Cumulative Impacts. In the unlikely event that all areas of the Hope Basin planning area are leased and all resources subsequently are developed over the life of the proposal, the total cumulative impacts on resident employment and population in the adjacent land area (Kobuk census division) during the years 1980-2000 would probably be low in the sense that only minor short-term stresses would be imposed on public and private services and facilities. These cumulative impacts include all anticipated non-OCS activities including onshore and offshore, as well as all OCS activities in this planning area or in other planning areas, which are expected to have employment or population impacts in the land area adjacent to the Hope Basin OCS planning area.

Anticipated OCS activities in this planning area, either at the mean expected resource development level or in the unlikely event of total development of all area resources, are not expected to have significant employment or population impacts in the land area adjacent to the Hope Basin planning area. The lack of significant employment or population impacts is due in part to the relatively low resource estimates for the area. In addition, most petroleum workers in the area would live in isolated dormitories during work periods, and would commute during frequent rest periods to permanent residences in other reigons of Alaska or out of State. Most in-state commuters would reside in Anchorage, which is many hundreds of miles from the Hope Basin planning area. The direct and indirect employment impacts in Anchorage, resulting from Hope Basin OCS activities, could total 100 additional jobs, and the population impact in Anchorage could be 200 additional residents. These minimal impacts in the Anchorage area are estimates which apply either to the mean expected or total resource development in the Hope Basin area.

The contribution of the proposal on the resident employment and population impacts would be low in the sense that only minor short-term stresses would be imposed on public and private services and facilities in the adjacent land area (Kobuk census division). This would be true either at the mean expected reosurce development level or in the unlikely event of total development of all area resources.

g) Native Subsistence Cultures: This planning area includes the villages of Wales and Shishmaref on the Seward Peninsula coast to the south, ten villages and the regional center of Kotztebue on Kotzebue Sound and Kivalina and Pt. Hope on the Chukchi Sea coast. While culturally tied to the whales, walrus and seals on which much of their diet and sociocultural systems depend, these villages nonetheless represent considerable diversity and heterogeneity in regional government, regional corporation leadership and in ways of life. Pt. Hope, Kivalina and Wales are traditional Inupiat whaling villages, which continue in this practice to a greater or lesser extent as in the past. Point Hope, with a 1980 population of 527, is the largest of these villages and is politically tied to other villages to the north as part of the North Slope Borough. Kotzebue and the villages surrounding it in the NANA region was a traditional trading center and has continued as an important source of entrepreneurship and leadership in Alaska Native corporate life. The NANA region 1980 population was 4,831. Wales and Shishmaref, both of which are enrolled in the Bering Straits Native Corporation, had a combined population of 527 in 1980. In spite of this diversity, all of these Inupiat Eskimo villages and Kotzebue, which is also predominatly Inupiat, rely on kinship-based relations and obligations, village-specific identities and mutal aid and assistance networks as on-going principles of organization.

Oilspill damage or other disturbances to local subsistence resources could both directly and indirectly affect subsistence villages dependent upon these resources. Direct effects would include diversion or displacement of the subsistence effort if migrating marine mammals, birds or fish altered their behavior in response to disturbance. Indirect effects would include alteration of the wilderness character of the area, social and cultural stress associated with shortages of customary and traditional resources in the places where they are usually found, and conflicts and competition over fish and game if sizable industrial workforce populations were allowed to hunt and fish in the area.

Mean expected oilspill rates for Hope Basin are 0.2 for spills equal to or greater than 1,000 barrels and 0.1 for spills equal to or greater than 10,000 barrels indicating low risk relative to other OCS planning aras.

Conclusion. Because of the low probabilities of discovered oil in this planning area, and because of the diversity of local available resources on which local villages depend for subsistence, regional impacts are expected to be low to moderate.

Cumulative Impacts. In the unlikely event that all areas of the Hope Basin planning area are leased and all resources subsequently are developed over the life of the proposal, the expected number of oilspills is 0.3 spills greater than 1,000 barrels, including 0.1 spill greater than 10,000 barrels. An additional unknown quantity of oilspills is expected to result from tankering from Federal OCS lease sales in the Barrow Arch planning area, from the Canadian Beaufort, and from development of State of Alaska territorial waters in Hope Basin. Additional projects or activities that could contribute to cumulative impacts in the planning area are development of NPR-A State and private onshore leasing and tanker traffic.

These total projects or activities could affect native subsistence cultures in the following ways. Oilspill damage or other disturbances to local subsistence resources could divert, displace or reduce the availability of subsistence resources. Major disruption in the access to or availability of local subsistence resources where they were traditionally found would disrupt traditional subsistence effort patterns to an extent as to, 1) reduce subsistence catch of the resources customarily used, 2) prevent the pursuit of subsistence practices by segments of the population due to the costs of using an increased subsistence range, 3) disrupt traditional cultural and spiritual patterns e.g., patterns of obligation fulfillment for kinship-based assistance networks and care of the elderly, i.e., and include chronic stress and anxiety over imbalances in nature, the fear of further changes in such relationships, and the inability to do anything about it. Impacts from such effects would include increased disease, malnutrition and mental disorders, family breakup and conflict, substance abuse and generational conflict. Localized impacts would be magnified within the region through the breakdown of customary inter-village (through family networks) resource distribution patterns and obligations.

The cumulative impacts of these oilspill events, projects and activities are expected to produce a moderate impact to native subsistence cultures in the Hope Basin planning area.

In the unlikely event that all resources in the planning area are leased and developed, the alternative contributes 67 percent of spills greater than 1,000 barrels. The most important causal agent for potential cumulative impacts on native subsistence cultures is tankering from offshore development in the Beaufort Sea. The contribution of the alternative to cumulative impacts is minor in either the case of only the resources described as developed or all resources leased and developed in the planning area as the tankering through the area overshadows impacts from the proposal in this area.

3) Other Management Plans: Kotzebue Sound, within which the Hope Basin lies, is entirely in the unorganized borough, although CRSA's have been

formed (Bering Strait and NANA region CRSA's). Both plans from the CRSA's should be approved by early 1984, with the sale scheduled for mid-1985.

4) Unavoidable Adverse Impacts: Oilspills, discharges of drilling effluents (muds, cuttings, and formation waters) and sewage disposal would result in unavoidable adverse impacts to water quality under the proposal. Impacts from all the above except oilspills could be mitigated by EPA NPDES regulation.

Water supply would be unavoidably adversely affected by this proposal. Limited supplies would be consumed by OCS-related infrastructure and development, creating demands on supplies of unknown quantity.

The unavoidable adverse impact for land use would be a reduction in the amount of land available for other uses. Occupation of land by OCS-related activities and structures will however, be minimal.

Coastal ecosystems would be unavoidably adversely affected by oilspills and various discharges as mentioned above for water quality. The level of impact would be restricted both geographically and temporally.

The proposal would have unavoidable adverse impacts on fish by oilspills contacting nearshore habitats or eggs and larvae which occur on or near the surface. Oilspills would also affect commercial fishermen by reducing the number of harvestable fish. These impacts are expected to be minimal.

Birds, marine mammals, and endangered species would also suffer unavoidable adverse impacts from oilspills. The level of impact would depend on when and where the oilspill occurred. Regional endangered species consultation with NMFS and FWS is required and will be conducted as needed.

Recreation and tourism resources may be affected unavoidably by damage to visual resources through the intrusion of onshore support infrastructure and road systems, nearshore systems of causeways, pipelines and drilling islands, offshore oil and gas platforms, and vessel and aircraft traffic supporting such operations. Such effects will be localized. In some cases, the tourism industry may be enhanced as areas are opened up with new roads.

Cultural resources offshore, such as housepits, burins, scrapers, arrowheads and other artifacts, could be unavoidably destroyed through OCS operations, but the great dynamics of the marine environment already may have resulted in the destruction of many of these resources. Cultural resources located onshore could be lost or damaged by pilfering or indiscriminate exposure of artifact sites.

Introduction of urban and industrial land uses, except for regional urban centers, would change the character of isolated, de facto wilderness areas, but impacts would be isolated and small in relation to the total area involved. Where urban centers are involved, land use demands generated by OCS activities could unavoidably produce adverse effects derived from the rate and relative scale of demand. Land speculation and price inflation could be experienced as well as interruptions in community facilities and infrastructure during the period necessary for such aspects of land development to catch up with

increased land use demands. This will occur primarily in Kotzebue Sound in the vicinity of the enclave.

Native subsistence cultures could be adversely affected directly in an unavoidable way through accidental oilspills and an increase in population, both of which are causal agents which could effect the access to and availability of subsistence resources. Such impacts have been discussed previously. Perhaps more insidious are the indirect adverse effects which could be caused unavoidably by nature of kinship-based social networks existing between regional centers and villages and the periodicity of urban-village migration customary in village regions. Localized effects in villages could have adverse effects throughout the village region. Disruption of customary urban-village migration patterns, through effects such as urban housing shortages, price inflation or reduced supply of public services, could cause hardship for those segments of the population unable or unwilling to adapt to such changes and contribute to social disorder and disorientation of cultural value systems.

5) Relationship Between Local Short-Term and Uses and Maintenance and Enhancement of Long-Term Productivity: In this section, the short-term effects and uses of various components of the environment are related to long-term effects and the maintenance and enhancement of long-term productivity. The effects of the alternative would vary in kind, intensity, and duration, beginning with preparatory activities (seismic data collection and exploration drilling) of oil and gas development, and ending when natural environmental balances might be restored.

Biological productivity would be lost in the short-term on all onshore lands used in the proposed project. These areas could be returned to productivity in the long-term with proper management. Restoration may not be entirely feasible; however, the overall loss would be a minor adverse effect. The direct land requirements would show in both the short-term and the long-term because of disturbance. Major construction projects would cause definite changes in both the short-term and long-term. Some species may have difficulty repopulating and could be displaced.

Short-term oil pollution and the possibility of long-term cumulative oil pollution impacts could cause serious adverse effects on all components of the marine ecosystem, including fisheries. While restoration would allow fisheries production to regain original levels, any reduced annual harvests during the life of the project would be irretrievably lost. The extent is not known presently, but the potential must be recognized.

Freshwater pollution from onshore activities is a short-term effect; recovery is expected.

The biota would be threatened in the short-term by potential oil pollution. Direct mortality could be significant through the combined effects of harassment by humans and the increased volume and frequency of noise from vessel traffic or overflying aircraft. In the long-term, such disturbances could alter behavior patterns and could drive fauna away from traditional feeding and breeding grounds or to other critical areas within their range, reducing species populations over a long period of time.

Habitat destruction could cause a reduction in subsistence species which could threaten the regional economy. The improved accessibility to primitive areas from increased construction is a short-term result of this alternative. The overall wilderness value of the coast may decrease from increased land use. Increased human populations in the short-term could change the regional native culture in the long-term. The subsistence way of life could be modified and population shifts could occur. The overall changes cannot be termed positive or negative, except by those affected.

Archaeologic and historic values discovered during development would enhance long-term knowledge. Overall, finds may help to locate other sites, but destruction of artifacts would represent long-term losses.

Consumption of offshore oil and gas would be a long-term use of non-renewable resources. Economic, political, and social benefits may accrue from the availability of oil and gas. Most benefits would be short-term and would decrease the nation's dependency on oil imports.

The production of oil and gas from the planning area would provide short-term, critically needed energy, and perhaps provide time either for the development of long-term alternative energy sources or substitutes for petroleum feedstocks. Petroleum development in these areas may mean the irreplaceable loss of some fisheries production. The maintenance and enhancement of long-term productivity would depend on efforts to control water quality levels. Regional planning would aid in controlling changing economics and populations, and thus, in moderating any adverse impacts.

6) Irreversible and Irretrievable Commitment of Resources

a) Mineral Resources: Resources discovered would be irretrievably consumed.

b) Social Systems: Lifestyle elements could be lost if full-scale development of OCS oil and gas resources occurs, and if enclave or modified enclave conditions are not maintained. Irretrievable loss of customary and traditional renewable resources could significantly damage the social and economic fabric of village life if access to fish and game was unrestricted, while significant growth of local human populations occurred with full development.

Lack of consideration by incoming OCS populations for traditional Eskimo culture and lifestyle may mean irretrievable loss of behavior patterns and their associated material products. The production of baskets, amulets, face masks, and certain subsistence tools are the result of traditional behavior patterns. These are examples of culture that could be lost through loss of traditional behavior patterns. Other irretrievable material products of past cultures such as archeological remains may be lost through looting of sites and indiscriminate or accidental trespassing on known and unknown sites.

Inflated living expenses would cause residents to spend greater percentages of expendable income on basic necessities, thereby foregoing the possibilities of a higher quality of life.

THE MORE SIGNIFICANT ENVIRONMENTAL CONSEQUENCES

Hope Basin

Resource Category	Level of Expected Impacts* Scheduled Sales Only Under Alternative I-1	Cumulative Impacts of All Activities
1. General Impacts		
a. Coastal Ecosystems	very low	low
b. Water Quality and Supply		
Water Quality	low	moderate
Water Supply	very high	very high
c. Navigation and Shipping	very low	very low
d. Other Uses of the OCS	n/a	n/a
e. Land Use	moderate to high	moderate to high
f. Cultural Resources	low to moderate	moderate
2. Impacts of Special Concern		
a. Fish and Commercial Fisheries		
Fish Resources	very low	low
Commercial Fisheries	very low	low
b. Endangered Species		
Cetaceans	moderate	moderate to high
Birds	moderate	moderate
c. Habitats and Resources of Special Concern		
Birds	moderate	moderate to high
Mammals	moderate	moderate to high
d. Air Quality	very low	low
e. Recreation and Tourism	low	moderate
f. Socioeconomic Factors	low	low
g. Native Subsistence Cultures	low to moderate	moderate

* Definitions of level of impact are provided at the beginning of Section V.D.

(This table also applies to Alternatives I-2, II, III-1, III-2, and IV-1. See text.)

c) Biological Resources: Commercial fishery losses may occur in several ways. For example, if the nearshore areas are contaminated, salmon and herring and king crab may avoid the areas in which salmon and herring are harvested. Any losses of commercial fishing incomes attributable to this alternative would be irreversible and irretrievable. Unharvested commercial finfish and shellfish, as renewable resources, would be irretrievably lost to the economy.

General industry activities, such as increased ship traffic, aircraft noise, and land-based activities, could displace marine and terrestrial birds and mammals into less favorable environments, which would eventually result in reduced population levels. This displacement could become irretrievable if permanent alterations to the environment and habitat were maintained by man.

d) Endangered Species: Under the proposal it is possible that endangered whales could be subjected to irreversible direct and indirect effects of oilspills, disturbance due to noise and other human activities, or losses and/or deterioration of habitat due to facility developments. Whether such effects would lead to permanent (irreversible) losses of whale resources is unknown.

e) Economic Systems: The only commitment that could be considered possibly irreversible and irretrievable would be the economic risk, resulting from OCS activity, of destruction of commercial fisheries resources or destruction of other fauna or flora used for subsistence by area residents.

b. Alternative I-2

Resource estimates and attendant activities, and oilspill probabilities are the same for this alternative as for Alternative I-1. This being the case, impacts resulting from this alternative would be the same as those described for Alternative I-1. In addition, impacts on other management plans and unavoidable adverse impacts would be the same as described for Alternative I-1. The relationship between short-term use of man's environment and long-term productivity for this alternative is the same as that described for Alternative I-1. The irreversible and irretrievable commitment of resources associated with this alternative is the same as described for for Alternative I-1.

For the cumulative case for this alternative, the number of oilspills associated with tankering of oil through Hope Basin from other OCS planning areas are identical to Alternative I-1. In addition, all other projects and proposals assumed for the cumulative case for Alternative I-1 are also assumed for this alternative. Thus, cumulative impacts for this alternative would be the same as those described for Alternative I-1.

c. Alternative II

Resource estimates and attendant activities, and oilspill probabilities are the same for this alternative as for Alternative I-1. This being the case, impacts resulting from this alternative would be the same as those described for Alternative I-1. In addition, impacts on other management plans and unavoidable adverse impacts would be the same as described for Alternative I-1. The relationship between short-term use of man's environment and long-term productivity for this alternative is the same as that described for Alternative

I-1. The irreversible and irretrievable commitment of resources associated with this alternative is the same as described for for Alternative I-1.

For the cumulative case for this alternative, the number of oilspills associated with tankering of oil through Hope Basin from other OCS planning areas are identical to Alternative I-1. In addition, all other projects and proposals assumed for the cumulative case for Alternative I-1 are also assumed for this alternative. Thus, cumulative impacts for this alternative would be the same as those described for Alternative I-1.

d. Alternative III-1

Resource estimates and attendant activities, and oilspill probabilities are the same for this alternative as for Alternative I-1. This being the case, impacts resulting from this alternative would be the same as those described for Alternative I-1. In addition, impacts on other management plans and unavoidable adverse impacts would be the same as described for Alternative I-1. The relationship between short-term use of man's environment and long-term productivity for this alternative is the same as that described for Alternative I-1. The irreversible and irretrievable commitment of resources associated with this alternative is the same as described for for Alternative I-1.

For the cumulative case for this alternative, the number of oilspills associated with tankering of oil through Hope Basin from other OCS planning areas are identical to Alternative I-1. In addition, all other projects and proposals assumed for the cumulative case for Alternative I-1 are also assumed for this alternative. Thus, cumulative impacts for this alternative would be the same as those described for Alternative I-1.

e. Alternative III-2

Resource estimates and attendant activities, and oilspill probabilities are the same for this alternative as for Alternative I-1. This being the case, impacts resulting from this alternative would be the same as those described for Alternative I-1. In addition, impacts on other management plans and unavoidable adverse impacts would be the same as described for Alternative I-1. The relationship between short-term use of man's environment and long-term productivity for this alternative is the same as that described for Alternative I-1. The irreversible and irretrievable commitment of resources associated with this alternative is the same as described for for Alternative I-1.

For the cumulative case for this alternative, the number of oilspills associated with tankering of oil through Hope Basin from other OCS planning areas are identical to Alternative I-1 as the cumulative impact analyses are based on eventual total development of all resources in the planning areas. In addition, all other projects and proposals assumed for the cumulative case for Alternative I-1 are also assumed for this alternative. Thus, cumulative impacts for this alternative would be the same as those described for Alternative I-1.

f. Alternative IV-1.a.

Under this alternative, the Hope Basin and Barrow Arch planning areas are combined. Resource estimates, infrastructure and expected numbers of oilspills

are expected to be slightly higher for the Hope Basin under this alternative than under Alternative I-1. However, since impacts associated with the development of resources are assumed to affect both the Barrow Arch and Hope planning areas, the impacts from this alternative on the Hope planning area will be similar to those discussed for Alternative I-1.

g. Alternative IV-1.b.

Under this alternative, the Hope Basin and Barrow Arch planning areas are combined. Resource estimates, infrastructure and expected numbers of oilspills are expected to be slightly higher for the Hope Basin under this alternative than under Alternative I-1. However, since impacts associated with the development of resources are assumed to affect both the Barrow Arch and Hope planning areas, the impacts from this alternative on the Hope planning area will be similar to those discussed for Alternative I-1.

h. Alternative IV-2.a.

Discussion of general impacts, impacts of special concern, other management plans, unavoidable adverse impacts, relationship between short-term use of man's environment and long-term productivity, and irreversible and irretrievable commitment of resources is not necessary as no resources would be leased in this planning area under this alternative. This alternative would cause no impacts.

The only impacts on the Hope Basin planning area would come from other projects and proposals and tankering of oil from the Canadian Beaufort. Cumulative impacts would be as described for Alternative I-1, because the projects considered and the resource amounts estimated to be tankered through the Hope Basin from other OCS areas are the same as those considered for Alternative I-1.

i. Alternative IV-2.b.

Discussion of general impacts, impacts of special concern, other management plans, unavoidable adverse impacts, relationship between short-term use of man's environment and long-term productivity, and irreversible and irretrievable commitment of resources is not necessary as no resources would be leased in this planning area under this alternative. This alternative would cause no impacts.

The only impacts on the Hope Basin planning area would come from other projects and proposals and tankering of oil from the Canadian Beaufort. Cumulative impacts would be as described for Alternative I-1, because the projects considered and the resource amounts estimated to be tankered through the Hope Basin from other OCS areas are insignificantly different than those considered for Alternative I-1.

THE MORE SIGNIFICANT ENVIRONMENTAL CONSEQUENCES

Hope Basin

Resource Category	Level of Expected Impacts* Scheduled Sales Only Under Alternative IV-2	Cumulative Impacts of All Activities
1. General Impacts		
a. Coastal Ecosystems	n/a**	low
b. Water Quality and Supply		
Water Quality	n/a**	moderate
Water Supply	n/a**	very high
c. Navigation and Shipping	n/a**	very low
d. Other Uses of the OCS	n/a	n/a
e. Land Use	n/a**	moderate to high
f. Cultural Resources	n/a**	moderate
2. Impacts of Special Concern		
a. Fish and Commercial Fisheries		
Fish Resources	n/a**	low
Commercial Fisheries	n/a**	low
b. Endangered Species		
Cetaceans	n/a**	moderate to high
Birds	n/a**	moderate
c. Habitats and Resources of Special Concern		
Birds	n/a**	moderate to high
Mammals	n/a**	moderate to high
d. Air Quality	n/a**	low
e. Recreation and Tourism	n/a**	moderate
f. Socioeconomic Factors	n/a**	low
g. Native Subsistence Cultures	n/a**	moderate

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* Definitions of level of impact are provided at the beginning of Section V.D.

** Differs from the proposal.

19. Barrow Arch

a. Alternative I-1

1) General Impacts

a) Coastal Ecosystems: The Barrow Arch planning area encompasses the same type of biologically sensitive areas as the proposed Diapir Field lease area (Refer to Section V.D.20.a.1.a). The impacts from oil and gas development would be similar.

Populations of birds, fish and marine mammals could be affected by noise and pollutant events affecting coastal breeding and feeding areas. These types of impacts would likely occur during development activity. Refer to Sections V.D.19.a.2)a), b), and c).

Over the life of the proposal 1.1 oilspills greater than 1,000 barrels including 0.5 oilspills greater than 10,000 barrels are expected to occur. Given this low number of spills, impacts to the coastal ecosystems are expected to be very low.

Conclusions. The expected level of impacts to the Barrow Arch planning area is expected to be very low.

Cumulative Impacts. In the unlikely event that all areas of the Barrow Arch planning area are leased and all resources subsequently are developed over the life of the proposal, the expected number of oilspills greater than 1,000 barrels is 4.3 and those greater than 10,000 barrels is 1.9. An additional unknown quantity of oilspills is expected to result from tankering from the Canadian Beaufort through the planning area. This could affect coastal ecosystems by increasing the risk of oilspills. The cumulative impacts of these oilspill events, projects and activities are expected to produce a low impact to coastal ecosystems.

In relation to the unlikely case of all resources in the planning area leased and developed, the alternative contributes about 26 percent of spills greater than 1,000 barrels and about 26 percent of spills greater than 10,000 barrels. The most important causal agent for potential cumulative impacts on coastal ecosystems is the development of the alternative. The contribution of the alternative to cumulative impacts is major in either the case of only the resources described in the proposal being developed or all resources leased and developed in the planning area.

b) Water Quality and Supply:

Water Quality: Onshore water quality is pristine except for local contamination in the vicinity of villages. Construction of onshore facilities and gravel mining for road and gravel island materials are the major threats to water quality. There would be short-term increases in water turbidity. Minor changes in land elevation would change drainage patterns and would cause long-term changes in erosion rates and chemical characteristics of the drainage waters.

Offshore water quality is pristine. If the expected commercial quantities of oil and gas occur, 825 million barrels of formation water would be produced. The predicted numbers of oilspills are 1.1 for spills of 1,000 barrels or more 0.5 spills of 10,000 or more barrels. Over the years of exploratory and developmental drilling, approximately 16,500 cubic yards of drill cuttings and 13,750 barrels of drilling mud would be discharged. These discharges would cause short-term reduction in water clarity over 0.02 percent of the planning area. Use of gravel islands could result in greater short-term losses of water clarity. If formation waters are discharged, they would release the equivalent of 190,000 barrels of oil into basin waters as dissolved hydrocarbons. Overall, petroleum development in the basin would result in moderate, chronic oiling of basin waters and loss of water clarity near drilling structures. A major spill would seriously but temporarily degrade water quality in the vicinity of the spill.

Water Supply: Water supply facilities are almost non-existent along the Barrow Arch. There are no facilities capable of handling industry needs. The oil industry at Prudhoe Bay is using gravel mining pits for water reservoirs; similar gravel pits will likely constitute the water storage system for industry along the Barrow Arch. Enclaved development either adjacent to established settlements or away from them will likely need to establish new water supply facilities. Where supplies are already serving an existing population and is not large enough to handle new growth, new facilities will be needed. Otherwise, and more probable, this will not be the case. Low impacts will occur in remote areas.

Conclusions. The effects on water quality from OCS activity in this area will be low, except possibly in the immediate vicinity of platforms. There are few developed waters system to support OCS activity, so new water supplies would have to be developed. Low impacts will occur to water supply.

Cumulative Impacts. In the unlikely event that all potential oil and gas resources of the Barrow Arch planning area are leased and subsequently developed in a timely manner, the expected number of oilspills is 4.3 spills of 1,000 barrels or more with 1.9 spills of at least 10,000 barrels. An additional unknown quantity of oilspills is expected to result from tankering of Canadian Beaufort Sea crude through the area. An additional unknown number of oilspills could also occur from development of Federal and Native Corporation onshore reserves. Development of all gas and oil reserves in the Barrow Arch planning area will result in discharge of 70,000 cubic yards of drill cuttings and 58,250 barrels of drilling mud during drilling phases. Formation waters produced would total 3,300 million barrels over the life of the field. Gravel drilling island construction and additional commercial traffic could contribute to cumulative impacts of these oilspill events and discharges which are expected to produce a moderate impact to water quality in the planning area.

In relation to the unlikely case of all resources in the planning area leased and developed, the Barrow Arch planning area in this alternative contributes 26 percent of spills of 1,000 barrels or more and 26 percent of spills of at least 10,000 barrels. The Barrow Arch planning area in this alternative would provide 29 percent of the impact from drilling mud, and 24 percent of the impact from formation waters. The greatest threat to Barrow Arch water quality is from oil pollution.

The most important causal agent for potential cumulative impact on water quality is Federal OCS leasing in the planning area. The contribution of the Barrow Arch planning area in this alternative to planning area cumulative impacts is major in the case of only the resources described in the proposal developed and in the case of all resources leased and developed in the planning areas. However, the contribution is not particularly significant in terms of habitat damage.

Cumulative Impacts. If all potential oil and gas resources of the Barrow arch planning area were leased and developed, new water supply facilities would be required, causing low impacts where no populations or other facilities are affected by the enclave siting. Other cumulative impacts are expected from onshore Federal and private oil leasing, population growth, and increased commercial activity. The sum effect of these additioanl impacts is also likely to be moderate. The proposed action in this planning unit under this alternative and with thtal resource development would constitute a significant portion of total water supply needs.

c) Navigation: Supply and crewboat traffic will not present significant marine traffic impacts in the area.

Conclusion. Impacts to navigation are very low.

Cumulative Impacts. Traffic passing the Barrow Arch region (Chukchi Sea) will, in the future, be primarily composed of Canadian tankering, hydrocarbon-related commercial traffic, and some tanker traffic generated from the Chukchi Sea region itself. Traffic related to hydrocarbon production activities will continue to constitute the vast majority of all traffic within the area. Traffic impacts generated by either mean resource case of the proposed action or total resource development in the area should be very low. Although Chukchi Sea activities may constitute up to ten 10 percent of all traffic, future vessel activity for the area indicates a low impact.

d) Other Uses of the OCS: The main uses of this area are subsistence hunting and fishing, discusssed below in Native Subsistence.

e) Land Use: There are no infrastructures adjacent to the planning area, with Kotzebue and Barrow being the closest communities. Assuming enclave development for the oil terminal, LNG plant, and service/supply base, land use impacts would be low, except where the enclave is located, because the land is undeveloped and no major land use conflicts are anticipated. Realistic location for the enclaves are not known, but the area required may be large, because of the amount of hydrocarbons believed to exist in the sale area. Enclaves would provide infrastructure for development and housing and occupy approximately 100 acres.

Conclusions. Land use impacts will be low and enclaves will be constructed in remote, undeveloped areas.

Cumulative Impacts. Other projects that will affect land use in the Barrow Arch area are tankering, vessel traffic, and onshore oil and gas development. These should affect land use as infrastructure to support the oil and gas development would have to be built, (none presently exists in the area).

For the total development scenario, land use impacts would affect 450 acres of land (four times that of the proposal) because of the need for a support/supply base and terminal facilities. The cumulative impacts of maximum resource development would result in moderate changes in land use. These changes are not anticipated to create major conflicts, however, and are therefore considered low to moderate.

f) Cultural Resources: National Register sites existing in the Point Hope, Barrow, and Harrison Bay USGS quandrangle would be impacted moderately by contact with oil exploration and development populations. (See OCS Lease Sale 71 DEIS for details on impacts and resources.) Offshore resources such as what may remain of the 33 shipwrecked whalers at Pt. Belcher, 1871, and 12 shipwrecked whaling vessels at Pt. Barrow in 1876 would be impacted by any OCS activities.

Conclusions. Impacts will be low to moderate, depending on level and location of oil and gas activity, as several sites are known or suspected.

Cumulative Impacts. In the unlikely event that all areas of the Barrow Arch planning area are leased and all resources subsequently are developed over the life of the proposal, the expected number of oilspills in 4.3 spills greater than 1,000 barrels with 1.9 spills greater than 10,000 barrels. Additional projects or activities that could contribute to cumulative impacts in the planning area are Canadian crude tankering, support vessel traffic, and onshore oil and gas. These total projects or activities could affect cultural resources in the following ways: population impacts (such as wear and tear on resources in the area and looting), and oiling of artifacts. The cumulative impacts of these oilspill events, projects, and activities are expected to produce a moderate impact to cultural resources in the Barrow Arch planning area. Due to the effect of natural forces on offshore resources, it is unlikely any remain in the offshore and tidal areas. Thus, oilspills are not considered a major impacting agent in this planning area.

In relation to the unlikely case of all resources in the planning area leased and developed, the alternative contributes 26 percent of spills greater than 1,000 barrels and 26 percent of spills greater than 10,000 barrels. The most important causal agent for potential cumulative impacts on cultural resources is population. The contribution of the alternative to cumulative impacts is moderate in the case of only the resources described as developed and is minor in the case for all resources leased and developed in the planning areas.

2) Habitats and Impacts of Special Concern:

a) Commercial Fisheries

(1) Impacts on Fish Resources: The fish resources of the Barrow Arch planning area are important primarily for their subsistance use. Species of importance include Bering cisco, least cisco, several whitefish species, and arctic cod. Impacts to these species would result from accidental oilspills, discharge of drilling effluents, and construction of causeways and gravel islands.

Over the life of the proposal, 1.1 oilspills greater than 1,000 barrels including 0.5 oilspills greater than 10,000 barrels are expected to occur.

Since the fish species of this area are very similar to those of the Diapir planning area (Refer to Section V.D.20.a.2)a)(1)), impacts from oilspills would be similar. Given the lower number of expected spills than in the Diapir Field, impacts from oilspills in the Barrow Arch planning area are expected to be very low.

Impacts resulting from construction causeways and gravel islands and effluent discharges would also be similar to those discussed for the Diapir planning area. Given the low number of installations (only one platform) expected for this area, these impacts would also be very low.

Conclusions. As a result of the proposal, the expected level of impact on fish resources is very low.

Cumulative Impacts. Cumulative impacts on the fish resources of this planning area could result from tankering of oil from the Canadian Beaufort through the Barrow Arch region. Additionally, development of the NPR-A could result in cumulative impacts to some of the anadromous species (Bering and least cisco, and white fish) of this region. The level of impact produced by these activities would be similar to their effect in the Diapir area (Section V.D.20.a)2)a). Since total resource development of Barrow Arch would result in about 4.3 oilspills greater than 1,000 barrels including 1.9 oilspills greater than 10,000 barrels, the cumulative impacts would be low (as opposed to very low for the proposal alone).

The contribution of the proposal (when total resource development is considered as part of the cumulative case) to the cumulative impacts would be minor. The contribution of the proposal when only the resources described in the alternative are developed would be moderate.

(2) Commercial Fisheries: There is no commercial fishing to speak of in the area.

b) Endangered Species: Endangered species that occur commonly and seasonally within the Barrow Arch planning area are the bowhead whale and gray whale. Other endangered cetaceans such as the fin and humpback whales are uncommon or rare in this area. The endangered peregrine falcon which occurs along the coast of the Hope Basin planning area may occur along the coast of the Barrow Arch area. Potential effects of oil and gas exploration and development on endangered species would come primarily from oil pollution and noise disturbance. The endangered species that could be affected by oil and gas activities in the Barrow Arch planning area are the gray whale and bowhead whale. It is very unlikely that other endangered cetacean species or the peregrine falcon would be significantly affected by OCS activities in this area although some peregrines could be affected by aircraft disturbance in the adjacent Hope Basin area. The biological opinions resulting from Section 7 Consultation between BLM and USFWS and NMFS state that pre-exploration and exploration activities are unlikely to jeopardize the continued existence of the gray whale and peregrine falcon. The NMFS biological opinion on the bowhead whale stated that exploration activities are not likely to jeopardize the continued existence of the bowhead whale.

Conclusions. Because of the importance of the Barrow Arch planning area as a migration corridor and possible feeding area for the bowhead whale and the use

of this habitat area by sizeable numbers of gray whale, endangered species could sustain a high level of impact. The expected level of impact to Peregrine falcons would be moderate.

Cumulative Impacts. In the unlikely event that all areas of the Barrow planning area are leased and all resources subsequently are developed over the life of the proposal, the expected number of oilspills is 4.3 spills greater than 1,000 barrels including 1.9 spills greater than 10,000 barrels. An additional unknown quantity of oilspills is expected to result from tankering from Canadian lease sales in the Arctic. An additional unknown number of oilspills could occur from development of State of Alaska territorial waters along the Beaufort Sea coast. Additional projects or activities that could contribute to cumulative impacts in the planning area are vessel traffic and activities (Federal and private). These total projects or activities could affect marine mammals through oilspills, disturbance, and reduction in habitat quality. The cumulative impacts of these oilspill events, projects, and activities are expected to produce a moderate to high impact to marine mammals and birds in the Barrow planning area.

In relation to the unlikely case of all resources in the planning area leased and developed, the alternative contributes 26 percent of spills greater than 1,000 barrels and 26 percent of spills greater than 10,000 barrels. The most important causal agent for potential cumulative impacts on marine mammals is seismic and other disturbances from Federal and state lease sales and on birds it is from habitat changes from onshore Federal and private lease sales. The contribution of the alternative to cumulative impacts is large in the case on only the resources described as developed or minor assuming all resources are leased and are developed in the planning area.

c) Habitats and Resources of Special Concern: Most of the Pacific walrus population migrates through and feeds within the Barrow Arch planning area. Large populations of ringed, bearded, and spotted seals and polar bears also occur in this area. A very large number (150,000) of nesting seabirds occur at Cape Lisburne and Cape Lewis, about 90% of which are highly vulnerable to oil pollution. Habitats of special concern for the above species in the Hope planning area are, 1) the rich benthic communities of mollusks (clams) utilized by large numbers of walrus and bearded seals, 2) marine waters near Cape Lisburne and Point Hope important foraging habitat of seabirds and marine mammals, 3) Kaseyaluk Lagoon and Peard Bay as important feeding and staging habitat for migratory waterfowl and shorebirds, and 4) the major seasonal ice leads as important migration corridors for marine mammals.

The major adverse impacts of OCS activities of the proposal could come from oil pollution of the marine environment and man-made disturbance. The species most likely to be significantly affected by the potential effect of OCS oil and gas activities in the Hope Basin planning area are diving seabirds especially if an oilspill occurs near Cape Lisburne or Cape Lewis. Ringed seals could be disturbed by seismic activities occurring on the shorefast ice during the pupping season leading to displacement from favorable habitat and reduction in annual productivity. Migratory waterfowl and shorebirds may be affected if an oilspill reaches coastal habitats such as Kasegaluk Lagoon and Peard Bay.

Marine mammals, particularly walrus could be adversely affected if a major oilspill impacts benthic communities in the area. The large walrus population

is presently considered to be under high natural stress. Any reduction or deterioration in benthic communities, even temporary local reduction in these organisms attributable to oil pollution, could contribute to a predicted walrus population decline.

Conclusion. Marine mammals and birds, and their habitats of special concern are expected to experience moderate to high impacts caused by the potential effects of OCS oil and gas activities in the Barrow Arch planning area discussed under the proposal.

Cululative Impacts. If all areas of the Barrow Arch planning area are leased and all resources subsequently are developed over the life of the proposal, the expected number of oilspills is 4.3 spills greater than 1,000 barrels including 1.9 spills greater than 10,000 barrels. An additional unknown number of oilspills could occur from development of State of Alaska territorial waters along the Beaufort Sea coast. Additional projects or activities that could contribute to cumulative impacts in the planning area are vessel traffic, Canadian offshore activities, and onshore (federal and private) oil and gas activities. These total projects or activities could affect birds and marine mammals through oilspills, and/or disturbance and habitat changes. The cumulative impacts of these oilspill events, projects, and activities are expected to produce a moderate to high impact to birds and marine mammals in the Barrow Arch planning area.

In the unlikely event that all resources in the planning area are leased and developed, the alternative contributes less than 26 percent of spills greater than 1,000 barrels and 26 percent of spills greater than 10,000 barrels. The most important causal agent for potential cumulative impacts on birds is likely to be habitat changes from onshore Federal and private lease sales. The contribution of the alternative to cumulative impacts is moderate or is low respectively in the case of only the resources described as developed or assuming all resources are leased and are developed in the planning areas. The most important causal agent for potential cumulative impacts on marine mammals is seismic and other disturbances from Federal and state lease sales. The contribution of the alternative to cumulative impacts is high in the case of only the resources described as developed or assuming all resources are leased and are developed in the planning areas.

d) Air Quality: A Discussion of the primary factors used in assessing onshore air quality impacts which may result from OCS-related activities and the method employed in quantifying the impact on this planning area are described in Section V.A.3 of this document.

It is estimated that 8 exploratory wells will be drilled to identify the resources and 47 development/production wells and 1 platform will be required to develop the resources under this alternative. It was assumed, for the purposes of analysis, that production from an average platform would be 10.0 million barrels of oil and 33.0 billion cubic feet of gas per year. The hydrocarbon resources are expected to be transported to a central transhipment point via subsea pipelines and tankered through Bering Strait and Unimak Pass and subsequently tankered beyond Alaska for refining and marketing.

Estimated representative emissions for exploration/development are provided in Table V.D.19.a.2)d)-1. This information is derived from Table V.A.3-1 and

assumes the use of platorm(s). It must be noted that if gravel islands are used, the platform installation values are not valid. However, as gravel islands will be close to shore, emissions during installation would likely be of concern.

TABLE V.D.19.a.2)d)-1.
ESTIMATED REPRESENTATIVE EMISSIONS

Activity	Production at Platform (tons per year)				
	VOC	NO_x	TSP	SO2	CO
oil/gas	31	451	n/a	0.05	172
barging	none	-	-	-	-

OCS facilities located wthin 20 miles of shore will require emission controls. Given the most likely location of the hydrocarbon resource in the Barrow Arch planning area, siting of the platform(s) within 20 miles is likely. A new gas processing plant is anticipated for the area as part of ANGTS and is associated with the gas produced within the proposal.

A low qualitative impact is expected from routine emissions. The area is in attainment for all air pollutants. The onshore gas processing plant would cause the most onshore impact, with the offshore sources contributing less. If a blowout, oilspill, or fire were to occur at a platform nearshore, short-term violations of several NAAQS could occur, depending on the type and duration of the accident.

Any emission sources which would adversely affect the onshore air quality would be subject to mitigation required by EPA and the State, if located onshore, or by DOI, if located on the OCS. ERG (1981) discusses mitigation measures for OCS facilities.

Conclusions. The level of expected regional air quality impacts from the proposal is low. This is influenced by nearshore OCS development and the siting of a new gas processing plant.

Cumulative Impacts. It is estimated that a total of 0.9 billion barrels of oil and 4.2 trillion cubic feet of gas exist in the Barrow Arch Federal OCS planning area. In the event that total development of all Federal reserves occurs over the life of this proposal, 5 new platforms with 188 wells would be required. It is very unlikely that this magnitude of development will occur over the life of this proposal.

The major influencing factors affecting the onshore air quality near the planning area as a result of this development are 1) the number of new wells drilled 2) the location of the platforms 3) the timing of the activities and 4) the instantaneous local meteorological conditions. The offshore development of this proposal contributes moderately to regional cumulative air quality associated with OCS development and the onshore development, in the form of gas processing plants to be built.

The increase in oil and gas development delineated in this proposal will occur as the entire onshore areas near the planning area grows as a result of non-OCS industrial growth in Alaska. In most cases OCS oil and gas activities will be

a small fraction of this overall growth. The cumulative impact of this overall growth will increase ambient air pollutant concentrations.

The other projects and proposals contributing to cumulative effects in the planning area would be barge traffic to Prudhoe Bay, tankering of oil from the Canadian Beaufort Sea, proposed lease sales in the National Petroleum Reserve, possible lease sales on state onshore and offshore tracts, leasing and production of all resources in the Barrow Arch, and to further sales and development in the Diapir Field. Total emissions of sulfur and nitrogen oxides would be greater than for the proposal alone and impact of pollutant fallout on the coastal tundra ecosystem would also be greater.

The air quality impacts caused by tankering the crude produced in the Barrow Arch through the Chukchi Sea, the Bering Sea and the Pacific Ocean would be unnoticeable.

Overall, cumulative regional air quality impacts in the planning area are expected to be low; local impacts will range from low to moderate. However EPA rules associated with the Clean Air Act and the DOI air quality rules have provisions to minimize these impacts.

e) Recreation and Tourism: Impacts to recreation and tourism in this area could occur from the oil-related population increases in Barrow and changes in the area made by oil exploration and development. Impact as related to the occurrance of oilspills from exploration and development depend on the amount of major shoreline designated or used for recreation, amount of shoreline designated as environmental preservation area, and oilspill factors such as miles of exposed shoreline front as a percentage of the total shorefront, amount of seasonal use, and the cleanup capability available. Impacts of oil exploration could be adverse to tourism if it changed the traditional ceremonial culture or the visual and wilderness quality of the area. This is possible southwest near Barrow which is connected to the major airways. Positive effects would be an increase in the OCS population of tourists wishing to see the resource area. Marks made by seismic ice roads on the tundra exploration and oil development facilities have been the main visual impacts in other adjacent development areas and is likely to also occur in this area. (See OCS Lease Sale 71 DEIS for details on impacts and resources.)

Conclusions. The overall effects of OCS development on recreation and tourism will be very low.

Cumulative Impacts. In the unlikely event that all areas of the Barrow Arch planning area are leased and all resources subsequently are developed over the life of the proposal, the expected number of oilspills is 4.3 spills greater than 1,000 barrels including 1.9 spills greater than 10,000 barrels. Additional projects or activities that could contribute to cumulative impacts in the planning area are Canadian crude tankering, support vessel traffic, and onshore oil and gas. Onshore development related to resource extraction in the NPR-R will also affect recreation and tourisim. The cumulative impacts of these oilspill events, projects, and activities are expected to produce a low impact to recreation and tourism in the Barrow Arch planning area.

In relation to the unlikely case of all resources in the planning area leased and developed, the alternative contributes less than 26 percent of spills

greater than 1,000 barrels and 26 percent of spills greater than 10,000 barrels. The most important causal agent for potential cumulative impacts on recreation and tourism is population and pressure from other federal lease sales. The contribution of the alternative to cumulative impacts is moderate in the case of only the resurces described in the proposal being developed and is minor when considering full development of the OCS resources as part of the cumulative.

f) Socioeconomic Factors: The probability of the discovery of commercial quantities of petroleum resources in the Barrow Arch OCS area is considered to be 76 percent, and the mean estimates of discoveries expected to result from the proposed 5-year leasing program are 240 million barrels of oil and 1.05 trillion cubic feet of natural gas.

Most petroleum workers in the area would probably live in isolated dormitories during work periods, and would commute during frequent rest periods to permanent residences in other regions of Alaska or out of state. Most in-state commuters would reside in the Anchorage region. The long-term employment impact resulting from the proposed 5-year leasing program, including all indirect employment effects, would total about 500 jobs statewide, and the corresponding population impact would be about 1,000 new residents of Alaska.

Conclusions. Even with a commercial discovery, most of the effects will occur in the form of 800 additional people in the State, mostly in Anchorage, which is judged capable of handling the increase. Otherwise, impacts would be low to moderate, depending on the interaction of industry with local communities.

Cumulative Impacts. If all areas of the Barrow Arch planning area are leased and all resources subsequently are developed over the life of the proposal, the total cumulative impacts on resident employment and population in the adjacent land area (Barrow-North Slope census division) during the years 1980 - 2000 would probably be moderate in the sense that only moderate short-term stresses could be expected on public and private services and facilities. (Although resident employment and population could increase by 30 percent, this is not an unusually large increase over a period of 20 years.) These cumulative impacts include all anticipated non-OCS activities as well as all OCS activities, in this planning area or in other planning areas, which are expected to have employment or population impacts in the land area adjacent to the Barrow Arch OCS planning area.

Anticipated non-OCS activites include possible large scale onshore natural gas development projects. However, most workers associated with any aspect of offshore or onshore petroleum development in the area would live in isolated dormitories during work periods, and would commute during frequent rest periods to permanent residences in other regions of Alaska or out of state, and would therefore have minimal impact on the resident employment and population of the land area adjacent to the Barrow Arch planning area (Barrow-North Slope census division). Non-OCS activities, including onshore natural gas development, are expected to account for about half of the cumulative impacts in the Barrow-North slope census division.

Anticipated OCS activities in the Diapir OCS planning area are also offshore from the Barrow-North Slope census division. However, as in the case of planned onshore activities, Diapir OCS development impacts on resident em-

ployment and population will be minimized by the fact that most petroleum workers will commute out of the region.

Anticipated OCS activities in this planning area, either at the mean expected resource development level or in the unlikely event of total development of all area resources, are not expected to have significant resident employment or population impacts in the land area adjacent to the Barrow Arch planning area (Barrow-North Slope census division). The lack of large impacts is due to the fact that most petroleum workers in the area will live in isolated dormitories during work periods, and will commute during frequent rest periods to permanent residences in other regions of Alaska or out of state. (Most in-state commuters will reside in the Anchorage census division, which is many hundreds of miles from the planning area. Statewide resident employment impacts of Barrow Arch OCS development could total 500 jobs at the mean expected resource development level, or 700 jobs in the unlikely event that all resources in the Barrow Arch planning area are developed. Statewide population impacts would be about twice the resident employment impacts).

The impact of the proposal on the resident employment and population would be very low in the sense that no significant stresses will be imposed on the public and private services and facilities in the adjacent land area (Barrow-North Slope census division). This would be true either at the mean expected resource development level or in the unlikely event of total development of all resources.

g) Native Subsistence Cultures: This planning area encompasses the shoreline of the Chukchi Sea and Arctic Ocean west of Pt. Barrow. The villages of Wainwright and Pt. Lay had a combined population of 519 in 1980, according to the North Slope Borough. Bowhead whaling, caribou and seal hunting and fishing are the primary subsistence pursuits which regulate seasonal patterns of activity, provide the bulk of local diet, and reaffirm traditional meanings, values and family-centered ways of life. The political and cultural importance of Wainwright whaling captains in the North Slope Borough and wider Inuit Circumpolar society is widely recognized and respected. While the village of Pt. Lay is more dependent upon caribou, boats from Pt. Lay helped land a Wainwright whale in 1981.

Recent construction employment in these villages and in others within the North Slope Borough, has not significantly reduced dependence on local subsistence foods but provides the means for more efficient harvesting of these resources. Chukchi Sea villages, while part of the North Slope Borough, are somewhat remote from the rapid sociocultural changes occurring in Barrow, and other villages resulting from continuing oil development along the Beaufort Sea coast. OCS lease sales and potential exploration and development in NPR-A could accelerate changes in these villages, contributing to individual, family and village sociocultural stress. Mean oilspill rates for this planning area are 1.1 for equal to or greater than 1,000 barrel spills and 0.5 for equal to or greater than 10,000 barrel spills, considerably less than those predicted for the Beaufort Sea (Diapir Field) area. On the other hand, the hazardous ice conditions of this planning area can be expected to increase the risks of drilling and/or oilspill cleanup efforts should this area be leased. Furthermore, the Kasegaluk Lagoon system and numerous river deltas add to the risks of environmental degradation from oilspills should one occur in this area.

Conclusions. The high probability of discovered recoverable oil and gas resources and the endangered status of the bowhead whale combine to assure high to very high impacts to North Slope Inupiat subsistence cultures from further leasing in the Barrow Arch area.

Cumulative Impacts. In the unlikely event that all areas of the Barrow Arch planning area are leased and resources subsequently are developed over the life of the proposal, the expected number of oilspills is 4.3 spills greater than 1,000 barrels including 1.9 spills greater than 10,000 barrels. An additional unknown quantity of oilspills is expected to result from tankering from the Canadian Beaufort. Additional projects or activities that could contribute to cumulative impacts in the planning area are development of NPR-A, state and private onshore leasing and tanker traffic. These total projects or activities could effect Native subsistence cultures in the following ways. Oilspill damage or other disturbances to local subsistence resources could divert, displace or reduce the availability or subsistence resources. Major disruption in the access to or availability of local subsistence resources where they were traditionally found could disrupt traditional subsistence effort patterns to an extent as to reduce subsistence catch of the resources customarily used, prevent the pursuit of subsistence practices by segments of the population due to the costs of using an increased subsistence range, disrupt traditional (cultural and spiritual) patterns of obligation fulfillment for kinship-based assistance networks and care of the elderly (as examples), and induce chronic stress and anxiety over imbalances in nature, the fear of further changes in such relationships, and the inability to do anything about it. Impacts from such effects could include increased disease, malnutrition and mental disorders, family breakup and conflict, substance abuse and generational conflict. Localized impacts could be magnified within the region through the breakdown of customary inter-village (through family networks) resource distribution patterns and obligations. The cumulative impacts of these oilspill events, projects and activities are expected to produce a high to very high impact to Native subsistence cultures in the Barrow Arch planning area.

In the unlikely event that all resources in the planning area are leased and developed, the alternative contributes less than 26 percent of spills greater than 1,000 barrels and 26 percent of spills greater than 10,000 barrels. Here the alternative contributes moderately to the total cumulative case. However, the most important causal agent for potential cumulative impacts on Native subsistence cultures is further development of offshore hydrocarbon resources in the Beaufort Sea. The contribution of the alternative to cumulative impacts is substantial in either the case of only the resources described as developed or all resources leased and developed in the planning area.

3) Impacts on Other Management Plans

Coastal Zone Management: The coastal zone adjacent to the Chukchi Sea sale area includes the area from Cape Lisburne to Franklin Point. There are no first class cities in this area, and only a few native villages, but the area is included in the North Slope Borough. Phases III and IV of the borough's CZM planning will address this area. It is not known when this planning will commence. The proposed North Slope CZM plan for the Prudhoe Bay area is geared toward strict environmental preservation and to what extent this philosophy will be carried over, or oil and gas facilities would be permitted, is unknown.

Fishery Management Plans: In addition to the statewide plans a plan has been written for herring in the Bering-Chukchi region.

4) Unavoidable Adverse Impacts: Oilspills, discharges of drilling effluents (muds, cuttings, and formation waters) and sewage disposal would result in unavoidable adverse impacts to water quality under the proposal. Impacts from all the above except oilspills could be mitigated by EPA NPDES regulation.

Water supply would be unavoidably adversely affected by this proposal. Limited supplies would be consumed by OCS-related infrastructure and developoment, creating demands on supplies of unknown quanity.

The unavoidable adverse impact for land use would be a reducetion in the amount of land available for other uses. Occupation of land by OCS-related activities and structures would be minimal.

Coastal ecosystems would be unavoidably adversely affected by oilspills and various discharges as mentioned above for water quality. The level of impact would be restricted both geographically and temporally.

The proposal would have unavoidable adverse impacts on fish by oilspills contacting nearshore habitats or eggs and larvae which occur on or near the surface. Oilspills would also affect commercial fishermen by reducing the number of harvestable fish. These impacts are expected to be minimal.

Birds, marine mammals, and endangered species would also suffer unavoidable adverse impacts from oilspills. The level of impact would depend on when and where the oilspill occured. Regional endangered species consultation with NMFS and FWS is required and would be conducted as needed.

Recreation and tourism resources could be adversely effected unavoidably by damage to visual resources through the intrusion of onshore support infrastructure and road systems, nearshore systems of causeways, pipelines and drilling islands, offshore oil and gas platforms, and vessel and aircraft traffic supporting such operations. Such effects would be localized and may serve as an attraction to a segment of the recreation and tourism population.

Cultural resources offshore, such as housepits, burins, scrapers, arrowheads and other artifacts, could be unavoidably destroyed through OCS operations, but the great dynamics of the marine environment already may have resulted in the destruction of many of these resources. Cultural resources located onshore could be lost or damaged by public pilfering or indiscriminate exposure of artifact sites.

Introduction of urban and industrial land uses, except for regional urban centers, would change the character of isolated, de facto wilderness areas, but impacts would be isolated and small in relation to the total area involved. Where urban centers are involved, land use demands generated by OCS activities could unavoidably produce adverse effects derived from the rate and relative scale of demand. Land speculation and price inflation could be experienced as well as interruptions in community facilities and infrastructure during the period necessary for such aspects of land development to catch up with increased land use demands.

Native subsistence cultures could be adversely effected directly in an unavoidable way through accidental oilspills and an increase in population, both of which are causal agents which could effect the access to and availability of subsistence resources. Such impacts have been discussed previously. Perhaps more insidious are the indirect adverse effects which could be caused unavoidably by nature of kinship-based social networks existing between regional centers and villages and the periodicity of urban-village migration customary in village regions. Localized effects in villages could have adverse effects throughout the village region. Disruption of customary urban-village migration patterns, through effects such as urban housing shortages, price inflation or reduced supply of public services, could cause hardship for those segments of the population unable or unwilling to adapt to such changes and contribute to social disorder and disorientation of cultural value systems.

5.) Relationship Between Local Short-Term and Uses and Maintenance and Enhancement of Long-Term Productivity: In this section, the short-term effects and uses of various components of the environment are related to long-term effects and the maintenance and enhancement of long-term productivity. The effects of the alternative would vary in kind, intensity, and duration, beginning with preparatory activities (seismic data collection and exploration drilling) of oil and gas development, and ending when natural environmental balances might be restored.

Biological productivity would be lost in the short-term on all onshore lands used in the proposed project. These areas could be returned to productivity in the long-term with proper management. Restoration may not be entirely feasible; however, the overall loss would be a minor adverse effect. The direct land requirements would show in both the short-term and the long-term because of disturbance. Major construction projects would cause definite changes in both the short-term and long-term. Some species may have difficulty repopulating and could be displaced.

Short-term oil pollution and the possibility of long-term cumulative oil pollution impacts could cause serious adverse effects on all components of the marine ecosystem, including fisheries. While restoration would allow fisheries production to regain original levels, any reduced annual harvests during the life of the project would be irretrievably lost. The extent is not known presently, but the potential must be recognized.

Freshwater pollution from onshore activities is a short-term effect. The long-term decrease in water quality may be considered to be a tradeoff for obtaining oil and gas resources.

The biota would be threatened in the short-term by potential oil pollution. Direct mortality could be significant through the combined effects of harassment by humans and the increased volume and frequency of noise from vessel traffic or overflying aircraft. In the long-term, such disturbances could alter behavior patterns and could drive fauna away from traditional feeding and breeding grounds or to other critical areas within their range, reducing species populations over a long period of time.

Habitat destruction could cause a reduction in subsistence species which could threaten the regional economy. The improved accessibility to primitive areas

from increased construction is a short-term result of this alternative. The overall wilderness value of the coast may decrease from increased land use. Increased human populations in the short-term could change the regional native culture in the long-term. The subsistence way of life could be modified and population shifts could occur. The overall changes cannot be termed positive or negative, except by those affected.

Archaeologic and historic values discovered during development would enhance long-term knowledge. Overall, finds may help to locate other sites, but destruction of artifacts would represent long-term losses.

Consumption of offshore oil and gas would be a long-term use of non-renewable resources. Economic, political, and social benefits may accrue from the availability of oil and gas. Most benefits would be short-term and would decrease the nation's dependency on oil imports.

The production of oil and gas from the planning area would provide short-term, critically needed energy, and perhaps, provide time either for the development of long-term alternative energy sources or substitutes for petroleum feedstocks. Petroleum development in these areas may mean the irreplaceable loss of some fisheries production. The maintenance and enhancement of long-term productivity would depend on efforts to control water quality levels. Regional planning would aid in controlling changing economics and populations, and thus, in moderating any adverse impacts.

6) Irreversible and Irretrievable Commitment of Resources

a) Mineral Resources: Resources discovered would be irretrievably consumed.

b) Social Systems: The primary structure of Inupiat social and political organization, culture, and identity is centered around the hunting of bowhead whales, sharing and distributing the hunt, and celebrations, crafts, and related activities associated with whale hunting. virtually every family on the North Slope is connected to whaling through personal experience in one or more aspects of the whaling complex. While other biological resources could be substituted, if bowhead whales were no longer available, there would be an irreversible and irretrievable loss of culture, meaning, and purpose in Inupiat society. The combined risk of oilspills and other disturbances when combined with other risks to the bowhead whale from Alaskan and Canadian Beaufort oil and gas development and tankering activity, and Bering Sea and Pacific OCS sales which transect the bowhead's traditional migratory routes could contribute to these losses. There will be an accelerated decline in the Inupiat social system which must be considered an irretrievable loss.

c) Biological Resources: General industry activities, such as increased ship traffic, seismic exploration activities, aircraft noise, and land based activities, could displace marine and terrestrial birds and mammals (particularly ringed seal and perhaps caribou) into less favorable environments. This would eventually result in reduced population levels. This displacement could become irretrievable if permanent alterations to the environment and habitat were maintained by man.

THE MORE SIGNIFICANT ENVIRONMENTAL CONSEQUENCES

Barrow Arch

Resource Category	Level of Expected Impacts* Scheduled Sales Only Under Alternative I-1	Cumulative Impacts of All Activities
1. General Impacts		
a. Coastal Ecosystems	very low	low
b. Water Quality and Supply		
Water Quality	low	moderate
Water Supply	low	high
c. Navigation and Shipping	very low	very low
d. Other Uses of the OCS	n/a	n/a
e. Land Use	very low	low to moderate
f. Cultural Resources	low to moderate	moderate
2. Impacts of Special Concern		
a. Fish and Commercial Fisheries		
Fish Resources	very low	low
Commercial Fisheries	n/a	n/a
b. Endangered Species	moderate to high	moderate to high
c. Habitats and Resources of Special Concern	moderate to high	moderate to high
d. Air Quality	low	low
e. Recreation and Tourism	very low	low
f. Socioeconomic Factors	low to moderate	low to moderate
g. Native Subsistence Cultures	high to very high	high to very high

* Definitions of level of impact are provided at the beginning of Section V.D.

(This table also applies to Alternative I-2, II, III-1, III-2, and IV-1. See text.)

d) Endangered Species: Under the proposal, it is possible that endangered whales could be subjected to irreversible direct and indirect effects of oilspills, disturbance due to noise and other human activities, or losses and/or deterioration of habitat due to facility developments. Whether such effects would lead to permanent (irreversible) losses of whale resources is unknown.

b. Alternative I-2

Resource estimates and attendant activities, and oilspill probabilities are the same for this alternative as for Alternative I-1. This being the case, impacts resulting from this alternative would be the same as those described for Alternative I-1. In addition, impacts on other management plans and unavoidable adverse impacts would be the same as described for Alternative I-1. The relationship between short-term use of man's environment and long-term productivity for this alternative is the same as that described for Alternative I-1. The irreversible and irretrievable commitment of resources associated with this alternative is the same as described for Alternative I-1.

For the cumulative case, all other projects and proposals assumed for Alternative I-1 are also assumed for this alternative. Thus, cumulative impacts for this alternative would be the same as those desribed for Alternative I-1.

c. Alternative II

Resource estimates and attendant activities, and oilspill probabilities are the same for this alternative as for Alternative I-1. This being the case, impacts resulting from this alternative would be the same as those described for Alternative I-1. In addition, impacts on other management plans and unavoidable adverse impacts would be the same as described for Alternative I-1. The relationship between short-term use of man's environment and long-term productivity for this alternative is the same as that described for Alternative I-1. The irreversible and irretrievable commitment of resources associated with this alternative is the same as described for Alternative I-1.

For the cumulative case, all other projects and proposals assumed for Alternative I-1 are also assumed for this alternative. Thus, cumulative impacts for this alternative would be the same as those desribed for Alternative I-1.

d. Alternative III-1

Resource estimates and attendant activities, and oilspill probabilities are slightly less for this alternative than for Alternative I-1. This being the case, impacts resulting from this alternative would not be significantly different from those described for Alternative I-1. In addition, impacts on other management plans and unavoidable adverse impacts would be the same as described for Alternative I-1. The relationship between short-term use of man's environment and long-term productivity for this alternative is the same as that described for Alternative I-1. The irreversible and irretrievable commitment of resources associated with this alternative is the same as described for Alternative I-1.

For the cumulative case, all other projects and proposals assumed for Alternative I-1 are also assumed for this alternative. Thus, cumulative impacts for this alternative would be the same as those desribed for Alternative I-1.

e. Alternative III-2:

Impacts for this alternative are the same as those for the proposal.

f. Alternative IV-1.a.

Under this alternative the Hope Basin and Barrow Arch planning areas are combined. Resource estimates and attendant activities, and oilspill probabilities appear slightly less for the Barrow Arch area under this alternative than for Alternative I-1. This being the case, impacts resulting from this alternative would not be significantly different from those described for Alternative I-1. In addition, impacts on other management plans and unavoidable adverse impacts would be the same as described for Alternative I-1. The relationship between short-term use of man's environment and long-term productivity for this alternative is the same as that described for Alternative I-1. The irreversible and irretrievable commitment of resources associated with this alternative is the same as described for Alternative I-1.

For the cumulative case, all other projects and proposals assumed for Alternative I-1 are also assumed for this alternative. Thus, cumulative impacts for this alternative would be the same as those described for Alternative I-1.

g. Alternative IV-1.b.

Under this alternative the Hope Basin and Barrow Arch planning areas are combined. Resource estimates and attendant activities, and oilspill probabilities appear slightly less for the Barrow Arch area under this alternative than for Alternative I-1. This being the case, impacts resulting from this alternative would not be significantly different from those described for Alternative I-1. Inaddition, impacts on other management plans and unavoidable adverse impacts would be the same as described for Alternative I-1. The relationship between short-term use of man's environment and long-term productivity for this alternative is the same as that described for Alternative I-1. The irreversible and irretrievable commitment of resources associated with this alternative is the same as described for Alternative I-1.

For the cumulative case, all other projects and proposals assumed for Alternative I-1 are also assumed for this alternative. Thus, cumulative impacts for this alternative would be the same as those described for Alternative I-1.

h. Alternative IV-2.a.

All sales from this planning area have been deleted from the schedule; therefore, no impacts are expected.

The analysis of cumulative impacts assumes eventual total development of resources in all areas. Therefore, the cumulative impacts are as described in Alternative I-1.

i. Alternative IV-2.b.

All sales from this planning area have been deleted from the schedule; therefore, no impacts are expected.

The analysis of cumulative impacts assumes eventual total development of resources in all areas. Therefore, the cumulative impacts are as described in Alternative I-1.

Barrow Arch

Resource Category	Level of Expected Impacts* Scheduled Sales Only Under Alternative IV-2	Cumulative Impacts of All Activities
1. General Impacts		
a. Coastal Ecosystems	n/a**	low
b. Water Quality and Supply		
Water Quality	n/a**	moderate
Water Supply	n/a**	high
c. Navigation and Shipping	n/a**	very low
d. Other Uses of the OCS	n/a	n/a
e. Land Use	n/a**	low to moderate
f. Cultural Resources	n/a**	moderate
2. Impacts of Special Concern		
a. Fish and Commercial Fisheries		
Fish Resources	n/a**	low
Commercial Fisheries	n/a	n/a
b. Endangered Species	n/a**	moderate to high
c. Habitats and Resources of Special Concern	n/a**	moderate to high
d. Air Quality	n/a**	low
e. Recreation and Tourism	n/a**	low
f. Socioeconomic Factors	n/a**	low to moderate
g. Native Subsistence Cultures	n/a**	high to very high

* Definitions of level of impact are provided at the beginning of Section V.D.

** Differs from the proposal.

20. Diapir Field

a. Alternative I-1

1) General Impacts

a) Coastal Ecosystems: The Diapir Field planning area encompasses many coastal shallows, such as lagoons river deltas, and marshes. These have seasonal high concentrations of migratory birds (11 million estimated), mammals, and other wildlife that could be seriously affected by oil pollution and other disturbances from oil and gas development in the vicinity during the spring and summer months.

Barrier islands, which played a primary role in the formation and protection of productive lagoons and bays, are important habitats for several bird species and important denning sites for polar bears. Oil contamination and other human disturbance of these areas could cause abandonment of this critical habitat by these species.

The coastal marshes and the tidal flats of the major river deltas (Colville, Sagavanirktok, and Canning Rivers) are particularly vulnerable to oilspills because of their local biological importance and high retention of spilled oil.

In order for a spill to be stranded in a marsh or onto the delta tidal flats, certain conditions must occur. The tide range for this region is quite low (10-30 cm average), and these critical areas become inundated by sea water only during storm surges. Therefore, it is reasonable to assume that a spill would need to occur simultaneously with a storm surge in order for "vast" areas of marshland or delta flats to be contacted. The probability of contact then, is dependent on the frequency of storm surges. Since these storm events occur with greater frequency during the latter part of the open water season, the probability of contact is greater at this time.

The retention potential for oil on both types of habitat found in this area has been rated as "very high" by the Alaskan Beaufort Sea Oilspill Response Body (ABSORB, 1981), and "7" and "8" (highest rating on a scale of "8") for tidal flats and marshes, respectively, by Nummedal (1980). The ratings reflect not only the retention capability of the substrate, but also the inefficiency or lack of mechanical (natural) oil removing processes (refer to Nummedal, 1980, for a more detailed discussion). Additionally, the lower environmental temperatures in the arctic generally result in spilled oil persisting longer due to the lower volatility and biodegradation of oil components (Rice et al., 1980). In both marshes and tidal flats oil could become incorporated into sediments, organic debris, or onto matted vegetation and remain for as long as 10 years (Nummedal, 1980), and possibly longer.

Impacts to the biological components of these habitats could result from direct contact with oil, a disruption of energy flow through the trophic structure (food chain), changes in species composition, and alteration of habitat. Presently, studies on the toxicity of oil to arctic marine organisms are limited. One set of studies (Rice et al., 1980) has shown what appears to be little or no difference in sensitivity between the arctic and subarctic animals to oil. Therefore, generalities which have emanated from these and other studies (Rice et al., 1979) which can be applied are: (1) sensitivity

generally increases from lower invertebrates to higher invertebrates and from higher invertebrates to fish; and (2) egg and larval stages are often the most sensitive and most vulnerable to the impact of oil pollution.

Differences do arise, however, when one considers that arctic ecosystems have fewer species and shorter food chains. Therefore, if a particular species is severely affected, there would be few replacement species (opportunists) to take over. Arctic habitats then would probably be more vulnerable than those of the subarctic of temperate habitats, and once changed would be less able to adjust even though individual species are generally very hearty and more tolerant of natural environmental extremes and limited amounts of pollution (Rice et al., 1979).

As oil is transported into these habitats direct contact of the invertebrate groups assembled in and near them would produce a variety of responses. Toxicity studies on arctic epibenthic invertebrates (amphipods and mysids) exposed to the water soluble fraction of Cook Inlet crude oil have shown 96-hour LC_{50} (lethal concentration to 50% of the test organisms) values between 2 and 4 parts per million (Rice et al., 1980). It would be difficult to state with any accuracy if toxic concentrations would occur; however, if they did, it would be likely that some of these organisms would be affected. Further, it is possible that some of these epibenthic organisms could escape mortality by dispersing from the contaminated area. Since oil is generally associated with surface slicks, the toxic component would probably be close to the surface and would have no direct effect on most of the epibenthos (organisms that crawl about the bottom) in an affected area. If oil is driven into the bottom sediments, then these organisms could suffer direct lethal effects, or their habitat could be rendered unusable. Sediments oiled with Prudhoe Bay crude oil in a long-term (30 weeks) study (Busdosh et al., 1978) demonstrated a change in species composition of the oiled substrate. Isopods were not affected; polychaetes were mixed in responses, while amphipods avoided recolonizing oil contaminated areas.

As oil contacts the delta tidal flats and becomes entrained into the sediments, it is possible that shallow areas adjacent to these flats could become contaminated for several years through low-level releases of trapped oil. It is also possible that these releases could produce toxic concentrations to larval or adult invertebrates, or create unsuitable habitat for invertebrate groups (such as the amphipods) in these shallow margins. Some infaunal organisms may be deleted from areas for long periods (several years) if oil is entrained into the substrate they inhabit. Densities of infaunal organisms are generally quite low, and a reduction in their numbers may not be significant.

Even though numbers of almost all types of organisms are less abundant relative to subarctic or temperate regions, recruitment from adjacent areas into affected areas would occur, but perhaps at a slower rate. This phenomenon does not seem unusual for the arctic region when one considers that extreme or harsh conditions in localized areas do occur naturally causing displacement or mortality of large numbers of organisms.

Impacts to marshes would probably be more severe than those of the delta tidal flats, because of the closed nature of arctic marshes which contributes to a higher potential for retention of oil. On the other hand, however, the closed nature of the marsh reduces the probability that oil would penetrate into the

marsh. As previously stated, high water conditions such as storm surge inundation would have to occur simultaneously with a spill event for a significant interaction to occur.

Oil contacting an arctic marsh would probably produce results similar to those observed from studies of oil added to tundra ponds (Barsdate et al., 1980). In these studies Prudhoe Bay crude oil applied at rates of 1.6 liters per square meter and .24 liters per square meter produced the following results: (1) At least half of the oil was lost during the first year folowing the spill, mostly by volatilization and chemical degradation. (2) Microbial activity was increased for a short duration but returned to control levels after 2 years. (3) Photosynthesis in phytoplankton (microscopic floating plant life) was reduced for several days, but soon returned to normal. (4) Abundance of phytoplankton remained unchanged; however, species composition was altered for up to 6 years. (5) During the first year no damage to vascular plants occured; however, growth of sedges was reduced in later years. (6) Zooplankton (floating or freeswimming microscopic animal life) species received high mortalities, with some species not returning for 7 years. (7) Many species of insect larvae were killed immediately and were still absent 6 years after the spill. (8) Chironomid (midge) larvae had no major effects on their numbers or production; however, one genus was nearly eliminated.

Impacts to the lagoonal ecosystems (primarily Simpson, Elson, and Beaufort Lagoons) from oil and gas development under the proposal would result from oilspills and causeway construction. The biological component of primary concern in this discussion is the epibenthic community (primarily mysids and amphipods) which serves as an important source of food for birds and fish that concentrate in the lagoon during the open-water season.

The impacts to the lagoonal epibenthic community from oil contamination would be very similar to those stated above. (Refer to Griffiths and Dillinger, 1980 for a more detailed discussion.) Organisms that come into physical contact could succumb, or these organisms could actively move out of the lagoon as a result of avoidance behavior. Oil entering this shallow lagoon would become mixed with the bottom sediments and organic debris. Any repopulation of the lagoon from stocks or marine invertebrates offshore would have to contend with an oil-contaminated substrate and food source. Thus, it is very likely that species composition would be different after oil-contamination of sediments. Depending on the size and location of the affected area, there could be a significant impact felt at the top of the food web (birds and fish). This may occur, however, the high flushing rate of the lagoons would likely counteract this impact. A rapid turnover of organisms could occur due to the large reservoir of these organisms in the large offshore area.

The second major source of impacts to lagoons is causeway construction. Depending on the design and location of the causeway, impacts could occur due to the disruption of the current regimes (both longshore and landward bottom currents) which serve to transport marine-derived nutrients and hosts of organisms (mysids and amphipods) into the lagoon (Griffiths and Dillinger, 1980). Temperature and salinity regimes could also be affected by causeways; however, the major epibenthos species are well adapted to the wide and abrupt changes that occur naturally in these parameters and therefore would probably not be affected (Griffiths and Dillinger, 1980).

It is important to note that construction of causeways is regulated by a permitting process administered by the U.S. Army Corps of Engineers under the provisions of Section 404 of the Federal Water Pollution Control Act. Under this process an environmental assessment would be made of several site- or design-specific alternatives, thus allowing the most environmentally preferred alternative to be identified. Mitigating measures could be required to reduce or eliminate impacts.

Over the life of the proposal 4.3 oilspills greater than 1,000 barrels including 1.3 oilspills greater than 10,000 barrels are expected to occur. The liklihood that these oilspills would contact a significant portion of these vulnerable habitats is low as discussed above. Therefore, the level of impact to these habitats would be low.

Conclusions. The level of expected impacts to the coastal marshes, lagoons and river deltas of the Diapir Field planning area is low.

Cumulative Impacts. If all areas of the Diapir Field planning area are leased and all resources subsequently developed over the life of the proposal, the expected number of oilspills is 7.2 spills greater than 1,000 barrels and 2.2 spills greater than 10,000 barrels. An additional unknown quantity of oilspills is expected to result from tankering of oil from the Canadian Beaufort. An additional unknown number of oilspills also could occur from development of State of Alaska territorial waters along the Beaufort Sea Coastline. These total projects or activities could effect marsh, lagoonal, and delta habitats by increasing the risk of oilspills. The cumulative impacts of these oilspill events, projects and activities are expected to produce a high impact to these coastal ecosystems.

In the event that all resources in the planning area are leased and developed, the alternative contributes about 60 percent of spills greater than 1,000 barrels and about 59 percent of spills greater than 10,000 barrels from OCS development. The most important causal agent for potential cumulative impacts on coastal ecosystems is the proposed and existing State of Alaska leases and resultant spills. Activities associated with these leases would be closer to the critical habitats. The contribution of the alternative to cumulative impacts is, however significant whether cumulative impacts include development of all resources in the Diapir Field planning area (total resource development) or only resources described for this alternative and non-OCS-related projects and proposals.

b) Water Quality and Supply

Water Quality: Onshore water quality is pristine except for local contamination in the vicinity of villages and the oil industry enclave at Prudhoe Bay. It is possible that the acidity of North Slope water could be increased by pollutants from offshore oil development, but this possibility cannot yet be quantified (OCS Lease Sale 1 DEIS). Gravel mining for construction of offshore islands drilling platforms would modify local drainages. Other impacts are similar to those for Barrow Arch under the proposal.

Offshore water quality is pristine but nearshore waters are seasonally affected by turbid river overflows. If the expected commercial quantities of oil and

gas occur, 5,800 million barrels of formation water would be produced. The predicted numbers of oilspills are 4.3 of 1,000 barrels or more and 1.3 of 10,000 barrels or more. Over the years exploratory and developmental drilling, approximately 113,000 cubic yards of drill cuttings and 94,800 barrels of drilling mud would be discharged. Along the Diapir Field, turbidity due to construction of offshore gravel islands have would much more impact than drilling discharges. However, the Beaufort Sea coastal waters are seasonally impacted with extremely turbid river overflows. The input of suspended sediments via local rivers should be much more than that of industry to the Beaufort Sea coast. In nearby Prudhoe Bay, formation waters are reinjected into the formations, in order to keep up reservoir pressures and to solve dispersal problems. It is very likely that this practice would continue offshore of Prudhoe Bay, in the Diapir Field. This would greatly cut the risk of chronic oil pollution. Overall, the major impact of petroleum development would be a moderate increase in offshore turbidity during seasonal periods of low river flow. A major oilspill would cause short-term, serious degradation of water quality in the vicinity of the spill.

Water Supply: Water supply problems have been chronic at the Prudhoe Bay onshore oilfield. In recent years, the oil industry has started to use gravel mining pits as water storage reservoirs. Development of offshore fields will accelerate both gravel mining and need for additional water storage capacity. Drainage patterns would be disrupted onshore. Surface freshwater may suffer some unknown degree of acidification from pollutant fallout. Some increase in turbidity of offshore water will occur because of drilling and gravel island construction, but this would be evident only during periods of low river input. The oil industry would have to build new water supply reservoirs to meet offshore needs. Onshore employees associated with the development of this alternative are assumed to be situated in the existing Prudhoe Bay enclave. Water facilities may require expansion.

Conclusions. The level of expected impacts on water quality would be moderate. The level of expected impacts on water supply would be very high.

Cumulative Impacts. In the event that all potential oil and gas resources of the Diapir Field planning area are leased and subsequently developed in a timely manner, the expected number oilspills is 7.2 spills of 1,000 barrels or more with 2.2 spills of at least 10,000 barrels. An additional unknown quantity of oilspills is expected to result from tankering of Canadian Beaufort Sea crude. An additional unknown number of oilspills could occur from development of State of Alaska offshore reserves in the Beaufort Sea (Sales 34, 36, 39, 43, 50) area. Development of all gas and oil reserves in the Diapir Field planning area would result in discharge of 194,000 cubic yards of drill cuttings 162,000 barrels of drilling mud during drilling phases. Formation waters produced would total 9,700 million barrels over the life of the field. Additioanl projects or activities which would contribute to cumulative impacts include gravel drilling island construction and increased commercial traffic. These projects and activities could affect water quality mostly by locally decreasing water clarity and increasing risk of fuel spills. The cumulative impacts of these oilspill events, discharges, and additional traffic are expected to produce a moderate impact to water quality in the planning area. In the event that all resources in the planning area are leased and developed, in the Diapir Field planning area, this alternative contributes 60 percent of spills of 1,000 barrels or more, and 59 percent of spills of at least 10,000

barrels. The Diapir Field planning area in this alternative would provide 69 percent of the impact from drilling mud, and 69 percent of the impact from formation waters. The greatest threat to Diapir Field water quality is from oil pollution from oil and gas activities.

The most important causal agent for potential cumulative impacts on water quality is the proposed action. The contribution in the Diapir Field planning area of this alternative to the cumulative impacts is significant in the case of only the resources described being developed as well as in the case of total resource development in the planning areas.

If all potential oil and gas resources of the Diapir Field planning area were leased and developed, new water supply facilities would be required, causing very high impact. Other cumulative impacts are expected from existing State and Federal onshore and offshore gas and oil leasing, private onshore oil leasing, and increased commercial activities; the sum effect of these additional impacts is also likely to be high. It is likely that the proposed action in this planning unit under this alternative would constitute a major portion of total water supply needs.

c) Navigation: The Diapar Field is by far the most active of the Alaska fields. Most of the transportation and freight requirements for the Diapir would be satisfied through the North Slope haul road and not via waterways. Material would be supplied to the haul road via barge traffic, arriving at the ports of Seward, Anchorage, and Whittier. During peak periods of Diapir activity, some congestion, particularly at the Port of Anchorage, may be experienced.

Conclusions. Navigational impacts are expected to be very low.

Cumulative Impacts. Impacts in the Beaufort Sea will, in the future, be almost entirely due to activities related to hydrocarbon exploration, development, and production activities. OCS-related traffic will constitute approximately ten-to-fifteen percent of all traffic. OCS produciton will be transported via TAPS to Valdez for shipment to the Lower 48. The proposed action would be a minor contributor to cumulative impacts whether cumulative impacts include total development of the resource or only resources described for this alternative in addition to non-OCS-related activities. Peak vessel activity would be intermittent and limited to a very short traffic season. In spite of the rapid increase of traffic in the Beaufort Sea over the next decade, overall vessel traffic levels will remain very low when compared to other international waterways; thus a low to moderate cumulative impact would be expected as a result of this alternative.

d) Other Uses of the OCS: The main uses of the area are subsistence hunting and fishing, discussed in Section V.D.20.a.2)g).

e) Land Use: The Prudhoe Bay/Deadhorse complex and Barrow are the sites of the only large-scale infrastructures in the area. Assumed for this proposal is enclave development, which already exists at Prudhoe Bay, and which could be
used for the subsequent Diapir Field sales. This would eliminate any further land use impacts, except perhaps for the need of space for temporary camps and

additional pipeline rights-of-way. If the Alcan gasline is built (which is assumed), no LNG plant would be necessary.

Conclusions. Land use impacts would be low, as there are existing developments in the area which are expected to be used. Additional land use disturbances may occur if present facilities have to be expanded to handle additional exploration or development needs for the proposal.

Cumulative Impacts. Other projects that will affect land use in the Diapir Field area are tankering, state and private oil and gas leasing, development from previous Beaufort Sea sales, and the gas pipeline. These should affect land use in that additional facilities would be needed to support construction of pipelines to shore. This will have a moderate to high impact on land use in parts of the adjacent lands.

It is expected that additional land use impacts, because of oil and gas development, would affect 200 acres of land. Because of the need for expanded support and supply facilities, pipelines, and roads, OCS development would moderately contribute to land use changes in the region.

For the total development of hydrocarbon resources in the planning area, land use impacts affect 500 acres of land because of the need for an expanded infrastructure. The results of maximum resource development result in moderate to high impacts on land use.

f) Cultural Resources: Development resulting from the proposed lease sale could cause direct and indirect adverse effects on terrestrial archaeologic and historic sites. (See Beaufort Sea EIS for details on impacts and resources.) Direct impacts to cultural sites could result from off-lease construction activities and oil contamination of site materials. Indirect impacts could result from the siting of oil and gas facilities adjacent to cultural sites, and from oiling of the cultural environment. Cultural resources in this area include grave sites and hunting/fishing camp remains. The development onshore related to the proposal is expected to occur in and around existing enclaves. The effect of this proposal on cultural sites is expected to be minimal. Because of icing and other natural processes, little is probably left of cultural resources offshore. Therefore, although there are a large number of expected spills as a result of the proposal, little or no damage to cultrual resources is expected to result from oilspills.

Conclusions. The overall impact on cultural resources from OCS activities is expected to be low.

Cumulative Impacts. Projects or activities that could contribute to cumulative impacts in the planning area are pipelines causeways, gravel islands, personnel, and facilities. These total projects or activities could affect cultural resources in the following ways: wear and tear on resources, and looting. The cumulative impacts of oilspill events (7.2 associated with full development of hydrocarbon resources) projects, and activities are expected to produce a moderate impact to cultural resources in the Diapir planning area.

The most important causal agent for potential cumulative impacts on cultural resources is population and changes in land use. The contribution of the

alternative to cumulative impacts is significant. This is true whether or not all the resources in the planning area are developed.

2) Impacts of Special Concern

a) Commercial Fisheries

1) Important Fish Resources: Fish of the arctic region differ from their conunter parts of sub-arctic or temperate regions in that less species diversity exists as well as fewer populations. Additionally, arctic fish have developed life history, behavioral, physiological, and population characteristics that enable them to exist under harsh and fluctuating environmental conditions of both daily and seasonal occurrence. Occasionally, such conditions cause high mortalities, especially to the more sensitive life stages (eggs or juveniles). Because of this, these fish populations seem adapted to withstand at least short-term fluctuations in the environment, whether natural or man-induced.

In general, it is the nearshore zone that contains the highest densities and species diversity of fish in this region, at least during the open water season. Anadromous and some freshwater fish move into the nearshore in the summer to feed and return to their respective rivers in the fall to overwinter and spawn. A few marine species also use this area for feeding, and with minor exceptions, return to the deeper more offshore regions during and following freeze-up to overwinter and spawn. It is therefore concluded that the nearshore zone would be the most sensitive to petroleum-related impacts, particularly in those areas that harbor overwintering fish in and near the major river deltas.

Activities, agents, or events associated with oil and gas development under the proposal, which could result in impacts on the fish resurces in and near the proposed sale area include contamination resulting from oilspills, construction of causeways and gravel islands, discharge of drilling effluents, stream alterations (gravel mining, water removal, and damming), and increased fishing pressure.

Oilspills: Even though scientific literature is replete with studies conducted on oil and fish interaction, this topic still remains one of the most poorly understood. This is largely because of the wide range of variability within and among species, types of oil, and environmental factors that affect both fish and oil. (Refer to Malins, 1977 for a more detailed discussion of these variables and factors.) To further complicate this issue, studies relating the effects of oil on arctic species are severely limited, and any assessment of impacts on arctic fish must rely heavily on information collected from studies of non-arctic species. Additionally, most of these studies have dealt with concentrations of oil or its toxic components which could not reasonably be expected to be found in the natural environment as a result of an oilspill. Their value then is limited only in defining the range of possible effects, and are generally not helpful in assessing possible impacts.

The interaction of oil and fish could produce a variety of lethal and sublethal responses. (Refer to Starr et al., 1981; Hamilton et al., 1978; and Malins, 1977 for a more detailed discussion of these responses.) Such responses include actual mortality if lethal concentrations are encountered, or damage to

fish (i.e., gills, skin, eyes, etc.) which could increase the susceptibility to disease and later lead to death. Sublethal effects include an assortment of physiological and behavioral responses which could alter the ability of the fish to resist disease, find food, or avoid predation. Also sublethal chronic effects may occur if fish are exposed to low-level concentrations over a long period of time. Such effects may involve declines in growth rates and reproductive rates, which could affect populations of fish over a long period. These sublethal effects are the most poorly understood, and as such would be difficult if not impossible to detect in the natural environment. Other effects could involve a loss or decline in fish prey organisms or tainting of commercial or subsistence species.

Over the life of the proposal, about 4.3 oilspills greater than 1,000 barrels and about 1.3 oilspill greater than 10,000 barrels are expected from Alternative I-1 Diapir sales. Based on the Oilspill Risk Analysis for OCS Lease Sale 71 (BLM, 1981),it is very likely that a spill would contact the nearshore, but it is unlikely that there would be significant interaction between fish and oil, unless a large spill contacts a critical area. This conclusion is based on observations (Craig and Haldorson, 1980; and Bendock, 1979) that the entire nearshore zone is used primarily by adult or juvenile species (Arctic and least cisco, Arctic char and white fish) as a migratory corridor and feeding area and not as a spawning area or significant rearing area for larval fish. Therefore, these least tolerant larval stages would not be exposed to contamination in the nearshore. Additionally, tagging studies (Craig and Haldorson, 1980) have shown that most species, particularly the anadromous species, are highly mobile and tend not to linger in one area for long periods. These fish move into and through nearshore areas in day-to-day pulses and are widely distributed over the length of the coastline throughout the open-water season (May-September). Since it has been suggested that adult fish are able to detect certain concentrations of oil, it is possible that these fish would avoid a contaminated area. Even if some fish were affected by lethal or sublethal concentrations (given their broad distribution), only a small portion of a population could be impacted in a single event. Additionally, the concentrations of oil or its toxic components found underneath an oil slick would not likely be acutely toxic to fish. Concentrations observed one-half to one meter beneath a slick from the Tsesis spill (Kineman et al., 1980) ranged from 50-60 ug/1 (parts per billion), which are three orders of magnitude less than any toxic concentrations (LC_{50} values) reported for fish from lab studies (Malins, 1977; Rice et al., 1980).

One marine species that could be more severely affected is the fourhorn sculpin, which tends to be less mobile than other arctic fish. Oil contamination could produce some indeterminate effects on this species. However, since these fish are relatively abundant and widely distributed, impacts would not be significant from a regional or population standpoint.

Nearshore areas that could sustain significant localized impacts to fish from oil contamination are the sub-ice overwintering areas in the major channels of the Colville River Delta where large concentrations of arctic and least cisco are known to overwinter and the river deltas to the east that support Arctic char populations (Sagavanirktok, Canning, Hulahula, Aichilik, and Kougakut Rivers). Additionally, a substantial concentration of boreal smelt occurs under the ice near Thetis Island off the Colville Delta. These species could be affected during the winter by residual oil contamination from a spill

contacting these areas during the open water season. These effects could includle either lethal or sublethal effects to fish (egg, larvae, or adult), a decline in fish prey organisms, or a tainting of fish flavor for those species of commercial or subsistence importance. It is likely that an increase in biological oxygen demand (BOD) could occur in shallow, confined, under-ice habitats; however, the Colville channels are typically 4 to 6 meters deep (Kogl, 1972), with deeper holes to 12 meters. Therefore, any increase in BOD is not likely to affect fish in these channels.

Diet studies on overwintering arctic and least cisco in the Colville Delta indicated that these fish feed almost entirely on one species of amphipod (at least during the year of the study). If it is assumed that this is the only prey species available, adverse consequences could be expected if the habitat for these amphipods was made unsuitable by oil contamination. Following the Tsesis spill (Kineman et al., 1980) this same amphipod species declined in areas affected by the spill. In another study (Busdosh et al., 1978) amphipods avoided recolonizing on arctic sediments oiled with Prudhoe Bay crude oil, even though other epibenthic invertebrates did recolonize.

Impacts to marine fish species in the inshore and offshore zones resulting from oil contamination are not expected to be significant. Even though interactions between these fish and oil could occur, fish densities are generally very low and species are widely distributed. Most marine species are either pelagic (occupying mid-water zones) or demersal (bottom dwellers), which in these greater water depths further reduces their probability of contact with oil. Since most marine fish species spawn during the winter under the ice, eggs would not be greatly exposed to oil contamination. Oilspills occurring during this period would be confined to relatively small areas under the ice and remain relatively stationary until break-up. Some eggs, especially buoyant eggs from species such as arctic cod, could be affected; however, the number would be extremely small.

The dredging operations associated with construction of gravel islands and causeways, could result in short-term localized impacts to fish by introducing sediment into the water column thereby affecting respiration and feeding, or entraining fish in intake devices used during the dredging operation. However, no significant impacts would be expected from these operations. Sediments introduced into the water column would be less than that which occurs naturally during spring break-up, or when storms resuspend bottom sediments. Fish densities are extremely low by temperate standards, and therefore entrainment of fish would only affect a smally number. Beneficial impacts could occur from island and causeway construction by providing additional shallow water habitat which tends to concentrate fish and fish prey organisms.

The construction of gravel causeways, especially across barrier island lagoon systems, could however, provide a potential for impacts to nearshore fish. These impacts could result from blockage or hindrance of migratory fish, alterations in temperature-salinity regimes, and disruption of water circulation patterns. While causeways could block or impede fish movements, most fish do appear to possess the capability to move around these barriers. This seems to be supported by fish movement studies around the existing ARCO causeway at Prudhoe Bay; however, low percentages of returns on tagged fish render the results from these studies inconclusive at this time.

Other studies on the ARCO causeway have shown that temperatures tend to be 2 to 4°C cooler and salinities 10 ppt higher on the west side compared to the east side (Bendock, 1979; Mungall, 1978). Although these differences are well within the range of fluctuations frequently observed in the study area (Craig and Haldorson, 1981), the consistent tendency for these differences might affect fish directly (temperature/salinity preference or avoidance responses) or indirectly (prey abundance and distribution). While one causeway may not have a significant impact, the construction of additional causeways could produce cumulative effects on the nearshore temperature and salinity regimes and result in significant consequences to anadromous fish. This is largely dependent on the location, design, and number of causeways that are constructed. Because of the lack of conclusive study results, it would be difficult to state with any certainty how severe these impacts might be.

It is important to note that construction of causeways is regulated by a permitting process administered by the U.S. Army Corps of Engineers under the provisions of Section 404 of the Federal Water Pollution Control Act. Under this process an environmental assessment would be made of several site or design-specific alternatives, thus allowing the most environmentally preferred alternative to be identified. Additionally, mitigating measures could be required to reduce or eliminate impacts as mentioned above. These measures may include breaching causeways at critical points, limiting length, restricting construction to certain locations, or limiting the number of causeways in a given area.

Discharges of Drilling Effluents: Recent studies have shown that the toxicity of certain drilling effluents is relatively low when adequately dispersed in marine waters. Additionally, these discharges are regulated by the EPA under Section 402 of the Federal Water Pollution Control Act. In light of the above, impacts to fish resources resulting from these discharges would generally not be significant, except for dischares that occur in low energy, poorly flushed areas that could potentially accumulate toxic concentrations. Such an area is the overwintering habitat of the boreal smelt located westward of Thetis Island off the Colville River Delta.

Of particular concern is the discharge of drilling muds beneath the ice into these habitats in waters less than 4 meters depth. A buildup of toxic heavy-metal concentrations associated with drilling muds could occur in these shallow waters and affect these fish directly by causing mortality, or by accumulating toxic components in fish tissues which could result in disease or alterations in reproductive capacity. Indirect effects include declines or displacement of prey organisms. All of these effects could be amplified by the stressful conditions (low oxygen and high salinity) which occur naturally during the winter period.

Because the areal extent of these smelt concentrations is not known at present, it is not possible to quantify the impacts resulting from these discharges. However, considering that this area is the only known concentration of boreal smelt along the Alaskan Beaufort Sea, it is possible that large quantities of discharged muds could have a significant regional effect on this species.

Stream Alterations: Activities that could occur with the onshore development of the proposal that would result in stream alterations include gravel mining, water removal, and dam construction. Gravel removal from streams utilized as

overwintering habitats may destroy or adversely alter spawning and rearing areas for anadromous species such as arctic char and/or the various whitefish species. It could also change flow regimes in streams to eliminate or prevent use of these overwintering areas. Water removal could also adversely alter these overwintering habitats by reducing their carrying capacity or completely eliminating them. Construction of dams could possibly produce localized adverse impacts to fish populations by preventing migrations into spawning and overwintering areas, or by reducing flows downstream and eliminating or reducing fish habitat.

While all of these impacts are possible, the activities which cause them are under regulation by various state and federal authorities. Environmental consequences resulting from these imnpacts could be mitigated effectively under this regulation. Therefore, no significant adverse impacts to fish would be anticipated from these activities.

Sport-Fishing: The influx of oil industry and related personnel into this region during the development phase, could result in increased harvest pressure through sport-fishing activities in areas located close to onshore base facilities. Additionally, construction of roads as indicated in the description of the proposal could provide access to areas away from base facilities.

The primary target species for this sport-fishery would probably include arctic char, lake trout, grayling, burbot, and possibly some of the whitefish species. Impacts resulting from this increase in fishing activity could include a short-term, localized decline in a targeted species, and localized competition for either commercial or subsistence species. These impacts, however, would not be expected to produce significant regional impacts. Local competition between subsistence, commercial and sport-fishing interests could be effectively mitigated through state regulations over such matters, which are enforceable by the Alaska Department of Fish and Game.

Conclusions. The expected level of impacts on the fish resources of the Diapir planning area would be low.

Cumulative Impacts. The development of the National Petroleum Reserve-Alaska (NPR-A) would increase the potential for impacts to both anadromous and freshwater fish in several ways. Introduction of pollutants (i.e. oil or drilling discharges) into the upper Colville River drainage could eventually be deposited in the delta, where they could impact the cisco and white fish stocks that overwinter here. However, with the enforcement of environmentally safe drilling practices, these impacts would be minimal. Additionally, construction of roads and pipelines, especially across streams and drainages, would result in increased sediment loading. While this additional loading may seem minute, when considering the large annual output of the Colville River, the spawning habitat of certain species occurring in these upper reaches could be impacted. The extent of the impacts, however, are unknown. Employment of proper road and pipeline designs would reduce these impacts to spawning habitats.

The proposed development that would occur under the State of Alaska Oil and Gas Leasing Schedule would increase the probability of oilspills occurring in the nearshore area along the portion of the proposed lease area east of Prudhoe Bay. While oil and fish interactions in this area would be very likely, a

significant regional impact to fish populations would remain unlikely (refer to discussion on oilspills in this section).

Should tankering of oil through the proposed lease area from the Canadian Beaufort-Mackenzie Delta area occur, additional risk of oilspills affecting fish resources would be expected. The oilspill risk analysis of the Sale 71 DEIS (BLM, 1981) however, indicates that this increase in risk would be insignificant.

Overall, the expected regional impacts to fish resources from cumulative impacts is low. The contribution of the proposal (whether or not total development of all resources is considered) to the cumulative case is large.

(2) Impacts on Commercial Fisheries: The only continuous commercial fishing operation on Alaska's North Slope is operated by a single family (Helmericks) during the summer and fall months. Almost all of this fishing activity occurs in the east channels of the Coville River Delta. Arctic cisco is the most important cash product, followed by broad whitefish, least cisco, and humpback whitefish. The average annual catch has been about 65,000 pounds.

Given that a low ecological loss is expected for the species of concern, a low economic loss is expected for this commercial fishing operation (see previous section on fish resources).

Conclusions. The expected impact to the commercial fishery of this planning area is low.

Cumulative Impacts. Cumulative impacts would result from those discussed previously (see section on fish resources). Development of all hydrocarbon resources in the planning area as well as other projects proposals described in the preceding section (fish) would not significantly alter the impacts discussed under the proposal.

b. Endangered Species: Endangered species that occur seasonally within the Diapir Field planning area include the bowhead whale and gray whale. Other endangered cetaceans such as the fin and humpback whales are rare in this area. The endangered peregrine falcon which occurs along the coast of the Hope Basin planning area could possibly occur along the coast of the Diapir Field planning area. Potential effects of oil and gas OCS activities would come primarily from oil pollution and disturbance. The bowhead whale could be significantly affected by OCS activities in the Diapir Field. Other endangered species such as the gray whale and the peregrine falcon occur in very low numbers in this area which represents marginal habitat for the Alaskan seasonal populations of gray whale and peregrine. Therefore it is very unlikely that the latter endangered species could be affected. Preliminary results of disturbance effects studies indicate boat traffic could disturb and displace bowhead whales. The effects of oilspills on bowhead whales are unknown because no observed interaction between this species and an oilspill has been documented. However, several potential effects are indicated in on-going biological studies of the bowhead whale, see discussion at the beginning of this subsection. In July of 1981 the Bureau of Land Management and the U.S. Geological Survey requested a joint regional consultation pursuant to Section 7(a) of the Endangered Species Act, considering all of the

operations pertaining to OCS oil and gas leasing and exploration in the Arctic offshore area. On June 24, 1980 the BLM received a biological opinion on a previous endangered species consultation held in conjunction with the joint Federal-State OCS Lease Sale. The June 1980 opinion concluded that the Department of the Interior could not (at that time) ensure that oil and gas activiteis which may result from the (BF) lease sale were not likely to jeopardize the continued existence of the Bowhead whale. Further, this opinion suggested reasonable and prudent alternatives which could be adopted so that activities associated with OCS leasing and exploration would not be likely to place the continued existence of the Bowhead Whale in jeopardy. As of March 3, 1982 the arctic regional biological opinion, to be provided in response to the July 1981 request for consultation, remains pending.

Conclusions. Because of the importance of the Diapir Field to the entire Alaskan population of bowhead whales as a migration corridor and late summer-fall feeding area, and the expected number of oilspills under the proposal, the level of impacts would be high.

Cumulative Impacts. If all areas of the Diapir planning area are leased and all resources subsequently are developed over the life of the proposal, the expected number of oilspills is 7.2 spills greater than 1,000 barrels, including 2.2 spills greater than 10,000 barrels. An additional unknown quantity of oilspills is expected to result from tankering from Canadian Beaufort lease sales and from development of State of Alaska territorial waters in the Diapir field. Additonal projects or activities that could contribute to cumulative impacts in the planning area are commercial vessel traffic. These total projects or activities could effect endangered whales and birds through oilspills, disturbance, and reduction in habitat quality. The cumulative of these oilspill events, projects, and activities are likely to produce a high impact to endangered whales in the Diapir planning area and a low impact to endangered birds.

In the unlikely event that all resources in the planning area leased and developed, the alternative contributes less than 60 percent of spills greater than 1,000 barrels and 59 percent of spills greater than 10,000 barrels. The most important causal agents for potential cumulative impacts on endangered whales are vessel traffic, pipelines and oilspills from development of Federal, State and Canadian leases. The contribution of the alternative to cumulative impacts is substantial in both the case of only the resources described in the proposal and total development of hydrocarbon resources in the planning area.

The most important causal agent for potential cumulative impacts on endangered birds is habitat changes from onshore Federal and State lease sales. The contribution of the alternative to cumulative impacts is minor whether considering only the proposal or total development of the hydrocarbon resources on the planning area.

c) Habitats and Resources of Special Concern: Large populations of ringed seal, and migratory waterfowl and shorebirds occur in this planning unit. Also sizeable populations of the bearded and spotted seal as well as beluga whale and polar bear occur here. Avian and marine fauna utilization and the productivity of this area is concentrated in the short open water season specifically in July-August. Habitats of special concern for the above species are: coastal lagoons and river deltas such as Elson Lagoon,

Simpson Lagoon, and Beaufort Lagoon as feeding and staging areas for migratory waterfowl, and shorebirds; the Colville River Delta as nesting and feeding habitat for migratory waterfowl; and shorefast ice and offshore ice leads as important or critical habitat for marine mammals. Terrestrial mammals that could be affected include the caribou.

The major adverse impacts of OCS activities of the proposal could come from oil pollution of the marine environment and man-made disturbance. The species most likely to be significantly affected by OCS activities in the Diapir Field is the ringed seal. This species is a resident to the area and relies on local habitats throughout the year. Geological seismic activities associated with OCS exploration and development are suspected to disturb ringed seal pupping, particularly on the shorefast ice zone. Such disturbance may cause displacement of seals and perhaps abandonment of ringed seal pups leading to reduction in annual productivity and local population declines. Intensive seismic activity occurring over most of the shorefast ice zone would likely occur under the proposal. If existing restrictions on seismic activity during the late winter period (March-April) are continued this disturbance impact could be minimized. Migratory waterfowl and shorebirds would very likely be affected if an oilspill occurs in the Diapir Field during the open water season or if it occurs during the winter period under the ice. However, the species of birds most likely to suffer mortalities are very abundant in the arctic and have quite high reproductive rates. Therefore, effects of oilspills on these species would likely be of short duration.

The primary potential effects of OCS activities on caribou would come from onshore support and development activities shoreward of the sale area. Human disturbance of caribou and habitat changes are the primary concerns. Human activities can cause temporary and possible permanent displacement of caribou, particularly cows and calves, from important habitats such as insect relief areas and preferred feeding habitats. Recent studies (Cameron et al., 1979 and Roby, 1978) indicate significant seasonal avoidance of the northern portion of the Alaskan pipeline corridor/haul road and the Prudhoe Bay area by cows and calves during the post calving period (May-August). Caribou can be greatly disturbed by low flying aircraft, fast moving ground vehicles, and other human activities (McCourt and Horstman, 1974; Calef et al., 1976; and Miller and Gunn, 1977; Horejsi, 1981). The response of caribou to potential disturbance is highly variable from no reaction to violent escape reactions depending on the distance of human activity, speed of approaching disturbance source, sex, age, physiological conditions of the animals, size of the caribou group, season, terrain, weather, and frequency of disturbance. Cow and calve goups appear to be most sensitive, especially during the summer months, while bulls appear to be the most sensitive during the breeding season.

Accomodation to aircraft disturbance and other human activities is thought to have occurred in several studies of ungulate populations in North America. The variablility and instability of arctic ecosystems dictates that caribou have the ability to adapt behaviorally to some environmental changes. Consequently, repeated exposure to human activities such as oil and gas exploration activities may lead to habituation. Bulls in the central arctic herd have apparently demonstrated this ability. Small groups of caribou that overwinter in the vicinity of Prudhoe Bay and NPR-A, being continually exposed to disturbance stimuli, have apparently adapted to human activities while the

majority of the caribou herds on the North Slope, which overwinter further inland, are less likely to adapt to human activities to which they are seasonally or intermittently exposed. It is not known whether displacement or avoidance by caribou of coastal habitats near Prudhoe Bay, or along the coast of the proposed sale area could significantly affect herd productivity.

Alteration of caribou coastal habitats may occur. The construction of additional gravel roads, processing facilities, and gravel mining for drilling platforms would alter or eliminate some caribou habitat on the North Slope. The possible constructing of an onshore pipeline from Cape Halkett or Camp Lonely to the TAPS terminal could alter some additional caribou during periods of heavy insect harrassment and may become oiled or may ingest contaminated vegetation. Toxicity studies of crude oil ingestion in cattle (Howeet al., 1973) indicate that anorexia, significant weight loss, and aspiration pneumonia leading to death are possible adverse effects of oil ingestion in caribou. These possible effects could increase mortality rates of caribou that interact with oil pollution.

While the overal effect of the above stresses on caribou remains somewhat questionable, it is expected that the number of animals affected would be small relatively to the whole Arctic population. Therefore, the level of expected impact from the proposed Diapir sales would be low.

Conclusions. The expected level of impacts on marine mammals and birds would be moderate to high. Expected impacts on caribou are low.

Cumulative Impacts. In the unlikely event that all areas of the Diapir planning area are leased and all resources subsequently are developed over the life of the proposal, the expected number of oilspills is 7.2 spills greater than 1,000 barrels and 2.2 spills greater than 10,000 barrels. An additional unknown number of oilspills could occur from development of State of Alaska territorial waters along the Beaufort Sea coast. Additional projects or activities that could contribute to cumulative impacts in the planning area are onshore oil and gas activities and Canadian offshore activities and tankering. These total projects or activities could affect birds through oilspills, distrubance, and alteration of habitats. The cumulative impacts of these oilspill events, projects and activities are expected to produce a moderate to high impact to birds and marine mammals in the Diapir planning area.

In relation to the case of all resources in the planning area leased and developed the alternative contributes less than 60 percent of spills greater than 1,000 barrels and 59 percent of spills greater than 10,000 barrels. The most important causal agent for potential cumulative impacts on birds is from land development from onshore Federal and State lease sales. The contribution of the proposal is signficant but not major in both the case of only the development of resources described in the proposal and the case in which all resources in the planning area are developed.

The most important impact agents on the marine mammals are seismic and other disturbance from other Federal and State lease sales and oil spills associated with offshore oil development. The proposal is a major contributor to cumulative impacts if full development of hydrocarbon resources is not considered. If total development of hydrocarbon resources in the planning area

is considered part of the cumulative impacts, the proposal is a minor contributor to cumulative impacts.

In addition to the proposed Diapir sales, other planned and current oil and gas activities and related development in the Beaufort Sea and on the North American arctic slope could result in a significant reduction in caribou and other terrestrial mammal populations. The Prudhoe Bay oil and gas development activities have displaced some caribou of the central arctic herd from calving and post calving areas (Cameron et al., 1979). Whether this displacement has significantly reduced caribou productivity or survival is unknown at this time. The development of the Kuparuk and Lisburne fields and exploration and possible development in other adjacent fields to Prudhoe Bay would further reduce available habitat and displace caribou from calving and post-calving areas. The Trans-Alaska Pipeline System (TAPS) has not been proven to cause any detectable significant effects on caribou except near its northern terminus in the Prudhoe Bay area in relationship to development activities.

The opening of the haul road from Fairbanks to the North Slope to public access with significant increases in motor traffic is likely to significantly increase disturbance of caribou along the pipeline corridor and could restrict seasonal movements if frequent motor traffic occurs during the spring and fall migration periods.

Oil and gas activities in the National Petroleum Reserve-Alaska (NPR-A) have occurred for several decades in various portions of the reserve with very limited production at Gubik, Barrow, and Umiat. These activities may or may not have had some effect on the western arctic caribou herd. The Federal government is proposing the leasing of all or part of the reserve for oil and gas exploration in the near future. If extensive development takes place over a major portion of the reserve, particularly on major calving areas, the western arctic caribou population is likely to be significantly affected.

The on- and offshore development of oil and gas in the MacKenzie Delta and the possible exploration and development of oil and gas on the Douglas Wildlife Range as well as future federal and state leasing in the eastern portion of the Diapir Basin could adversely affect the Porcupine Caribou Herd on the eastern North Slope. If exploration and development occur on the major calving area serious impacts could occur (USDI, 1976).

Proposed state leasing offshore in the western Beaufort and possible Arctic Slope Regional Corporation oil and gas leasing on the North Slope would be additional activities that may adversely affect the arctic caribou herds.

In conclusion, the increase in habitat alteration, increased disturbance, and temporary or permanent displacement of female and calf caribou groups from North Slope habitats as a result of the above projects is likely to produce significant, long-term effects and perhaps cause permanent reduction in caribou populations in the arctic. The expected level of impacts would be high.

d) Air Quality: A discussion of the primary factors used in assessing onshore air quality impacts which may result from OCS-related activities and the method employed in quantifying the impact on this planning area are described in Section V.A.3 of this document.

It is estimated that 45 exploratory wells will be drilled to identify the resources and 332 development/production wells and 8 platforms required to develop the resources under this alternative. It was assumed, for the pruposes of analysis, that production from an average platform would be 7.0 million barrels of oil and 37.0 billion cubic feet of gas per year. The hydrocarbon resources are expected to be transported to shore via subsea pipelines, pumped to Valdez via TAPS, and transported via tanker to ports outside Alaska. The air quality impacts associated with tankering the Diapir Field hydrocarbons from Valdez are considered in the cumulative impacts discussion for the Gulf of Alaska planning area as TAPS output.

Estimated representative emissions for exploration/development are provided in Table V.D.20.a.2)d)-1. This information is derived from Table V.A.3-1. Because gravel islands are likely in this area, platform installation values are not valid. However, because gravel islands will be used only close to shore, emissions during installation would likely be of concern. The islands will require emission controls as they are to be located within 20 miles of shore.

TABLE V.D.20.a)d)-1
ESTIMATED REPRESENTATIVE EMISSIONS

Activity	Production at Platform (tons per year)				
	VOC	NO_x	TSP	SO_2	CO
oil/gas	40	578	n/a	0.07	218
barging	none	-	-	-	-

A new gas processing plant is associated with development of the resources described in the alternative. Such a facility is associated with ANGTS.

A low qualitative impact is expected from routine emissions. The area is at attainment for all air pollutants. The onshore gas processing plant would cause the most onshore impact, with the offshore sources contributing less. If a blowout, oilspill, or fire were to occur at a platform nearshore, short-term violations of several NAAQS could occur, depending on the type and duration of the accident.

Any emission sources which would adversely affect the onshore air quality would be subject to mitigation required by EPA and the State, if located onshore, or by DOI, if located on the OCS. ERG (1981) discusses mitigation measures for OCS facilities.

Conclusions. The overall level of impact associated with the development of the resources in the Diapir Field is low for air quality due to both the nearshore development and a new gas processing plant.

Cumulative Impacts. It is estimated that a total of 2.8 billion barrels of oil and 14.8 trillion cubic feet of gas exist in the Diapir Field Federal OCS planning area. In the event that total development of all Federal reserves occurs over the life of this proposal, 14 new platforms with wells would be required. It is unlikely that this magnitude of development will occur over the life of this proposal.

The major influencing factors affecting the onshore air quality near the planning areas as a result of this development are 1) the number of new wells drilled, 2) the location of the platforms, 3) the timing of the activities, and 4) the instantaneous local meteorological conditions. The offshore development of this proposal contributes moderately to regional cumulative air quality impacts associated with OCS development; Onshore development, in the form of potential gas processing plants contributes moderately to the OCS-related regional and local cumulative air quality.

The increase in oil and gas development delineated in this proposal will occur as the entire onshore areas near the planning area grow as a result of unrelated industrial growth in Alaska. In most cases, oil and gas activities will be a moderate fraction of this overall growth. The cumulative impact of this overall growth will increase ambient air pollutant concentrations. Other projects, proposals and activities influencing the air quality over the life of the proposal in the planning area included the following: nearshore and State and Federal oil and gas development and transportation (tankering), barging/tankering of Canadian Beaufort oil through the area, and ANGIS. Total emissions would be greater for these projects than for the development of either the most likely volume of hydrocarbons described under Alternative I-1 or total development of OCS resources.

Overall, cumulative regional air quality impacts are expected to be low; local impacts will range from low to moderate. However, EPA rules associated with the Clear Air Act and the DOI air quality rules have provisions to minimize these impacts.

e) Recreation and Tourism: Limited sport fishing will probably be done by exploratory and production personnel in the immediate vicinity of any drilling rigs and camps, although the oil companies generally frown on it. The State of Alaska may enact regulations against sport fishing within the lease area as they have done within a 5-mile limit on either side of the trans-Alaska pipeline north of the Yukon River. Subsistence fishing is closed in offshore waters and in waters draining into the Beaufort Sea from Bullen Point to the Kalubik River. No other increases in recreational use of the arctic coast area due to the proposed actions are anticipated, as these actions are not expected to increase the limited and costly transportation of recreationalists into the area.

Tourism in the arctic's coastal areas is not expected to increase because of the proposal, since the proposal would not provide tourists with new transportation debarcation points, and existing tourist attractions have very limited as well as costly transportation approaches and accommodations.

Tourism into Prudhoe Bay would not be adversely impacted by the proposed action because one of the major incentives for tourists to travel to the area is the unique quality of the industrial enclave.

Impact as related to the occurrance of oilspills from exploration and development depends on the amount of major shoreline designated or used for recreation, amount of shoreline designated as environmental preservation area, and oilspill factors such as miles of exposed shoreline front as a percentage of the total shorefront, amount of seasonal use, and the cleanup capability available.

Conclusions. Overall, the proposal is expected to have a low impact on recreation or tourism in or adjacent to the proposed lease sale area. The intrinsic wilderness qualities of the Beaufort Sea nearshore area and adjacent coast could be moderately affected by the siting of oil and gas facilities within or immediately adjacent to undeveloped portions of the area.

Cumulative Impacts. In the unlikely event that all areas of the Diapir planning area are leased and all resources subsequently are developed over the life of the proposal, the expected number of oilspills is 7.2 spills greater than 1,000 barrels including 2.2 spills greater than 10,000 barrels. An additional unknown number of oilspills could occur from development of State of Alaska territorial waters in the Beaufort. Additional projects or activities that could contribute to cumulative impacts in the planning area are Canadian tankering, pipelines, gravel islands, personnel, and facilities. The cumulative impacts of these oilspill events, projects, and activities are expected to produce a moderate impact to recreation and tourism in the Diapir planning area.

In relation to the unlikely case of all resources in the planning area leased and developed, the alternative contributes less than 60 percent of spills greater than 1,000 barrels and 59 percent of spills greater than 10,000 barrels. The most important causal agent for potential cumulative impacts on recreation and tourism is population. The contribution of the alternative to cumulative impacts is moderate in the case of only the oil and gas resources described as developed and is minor in the case of all oil and gas resources leased and developed in the planning areas.

f) Socioeconomic Factors: Among all of Alaska's OCS planning areas, the Diapir area contains by far the largest expected finds of both oil and natural gas; the probability of commercial discoveries of petroleum is considered virtually 100 percent. Assuming commercial discoveries do occur, the volume of oil expected to be discovered as a result of the proposed 5-year leasing program is 1.66 billion barrels, and the volume of natural gas is 8.85 trillion cubic feet. Very few jobs involved in petroleum development of the Diapir area would be held by workers who maintain a permanent residence in the adjacent Barrow-North Slope Census Division. Jobs directly involved in offshore petroleum development would be held by workers who live in isolated dormitories during work periods, and virtually all of these workers would commute during rest periods to permanent residences in other regions of Alaska or out of state. Most in-state commuters would reside in Anchorage or other parts of southcentral Alaska, with smaller numbers residing in Fairbanks or the surrounding region. A few in-state commuters would reside in scattered locations throughout Alaska. Judging from comparisons with the impacts of onshore petroleum development at Prudhoe Bay, long-term employment impacts could be about 2,700 additional jobs in Anchorage and southcentral Alaska, plus 500 new jobs in Fairbanks and the surrounding region, and another 100 jobs in scattered locations. These job impact figures for the various regions include indirect employment effects in retail trade and services, transportation, and local government, as well as petroleum workers who reside in the respective regions. The population impacts would be roughly twice the long-term employment gains, resulting in about 6,400 additional permanent residents in Anchorage and southcentral Alaska, and 1,200 new permanent residents in Fairbanks and other areas.

Conclusions. About 6,600 additional people would be in the state as a result of Diapir Field sales, most in Anchorage, but many in Fairbanks. This would tax local services and housing in these areas, but should generally be good for the economies of both places. Otherwise, effects should be low. Impacts in the planning area are expected to be low.

Cumulative Impacts. In the unlikely event that all areas of the Diapir planning area are leased and all resources subsequently are developed over the life of the proposal, the total cumulative impacts on resident employment and population in the adjacent land area (Barrow-North Slope census division) during the years 1980 - 2000 would probably be moderate in the sense that only moderate short-term stresses could be expected on public and private services and facilities. (Although resident employment and population would increase by 30 percent, this is not an unusally large increase over a period of 20 years). These cumulative impacts include all anticipated non-OCS activities as well as all OCS activities, in this planning area or in other planning areas, which are expected to have employment or population impacts in the land area adjacent to the Diapir OCS planning area.

Anticipated non-OCS activites include possible large scale onshore petroleum development projects. However, most workers associated with any aspect of offshore or onshore petroleum development in the area would live in isolated dormitories during work periods, and would commute during frequent rest periods to permanent residences in other regions of Alaska or out of state, and would therefore have minimal impact on the resident employment and population of the land area adjacent to the Diapir planning area (Barrow-North Slope census division).

Anticipated OCS activities in the Barrow Arch OCS planning area are also offshore from the Barrow-North Slope census division. However, as in the case of planned onshore activities, Barrow Arch OCS development impacts on resident employment and population will be minimized by the fact that most petroleum workers will commute out of the region.

Anticipated OCS activities in this planning area, either at the mean expected resource development level or in the unlikely event of total development of all area resources, are expected to have resident employment or population impacts in the land area adjacent to the Barrow Arch planning area in the sense of creating only moderate short-term stress on public and private services and facilities. The lack of large impacts is due to the fact that most petroleum workers in the area will live in isolated dormitories during work periods, and will commute during frequent rest periods to permanent residences in other regions of Alaska or out of state. (Most in-state commuters will reside in the Anchorage census division, which is many hundreds of miles from the planning area. Statewide resident employment impacts of Diapir OCS development could total 3,300 jobs at the mean expected resource development level, or 3,900 jobs in the unlikely event that all resources in the Barrow Arch planning area are developed. Statewide population impacts would be about twice the resident employment impacts).

The contribution of the proposal to the cumulative impact on the resident employment and population would be low to moderate in the sense that only low to moderate short-term stress would be imposed on public and private services and facilities in the adjacent land area (Barrow-North Slope census division).

This would be true either at the mean expected resource development level or in the unlikely event of total development of all area resources.

g) Native Subsistence Cultures: For a more comprehensive discussion of Diapir Field Inupiat cultural systems, refer to the Diapir Field DEIS, OCS Lease Sale 71. The planning area encompasses the villages of Barrow, Nuiqsut and Kaktovik on the Beaufort Sea Coast, and to a lesser extent, Atqasuk and Anaktuvuk Pass, inland villages that nevertheless share in Barrow and Kaktovik bowhead whale harvests or utilize the coast for subsistence purposes. The population of these North Slope villages in 1980 was 4,200, according to the North Slope Borough. An additional 4,000 construction, oil industry, and Federal workers, reside in isolated camp settings on the North Slope, over 300 of which currently reside at Prudhoe Bay-Deadhorse.

In spite of continuing and accelerating oil exploration and development on the North Slope, Inupiat cultural systems, ways of life and diet are still heavily dependent upon subsistence harvests, activities and traditions. Whaling and other subsistence activities still involve over 70 percent of Inupiat households in hunting, preparing or sharing of the catch. Barrow, as regional government center and historical whaling capital, is currently undergoing the greatest amount of sociocultural change associated with energy development, and resulting from regulatory changes imposed on the harvest of bowhead whales and caribou.

Continuing OCS lease sales can be expected to continue or accelerate these changes and associated social problems, particularly in the event of a major oilspill. The statistically derived mean number of spills equal to or greater than 1,000 barrels is 4.3 for this planning area, reflecting the high likelihood of finding additional oil and gas resources there. The mean number of spills equal to or greater than 10,000 barrels is 1.3 for the Diapir Field. Oiling of whales and other marine mammals during their migration through the area, or other disturbance associated with industrial use of the area could directly affect subsistence harvest of these resources if whale or other marine mammal migration routes were altered, populations of whales or other marine mammals diminished or harvesting activities were disturbed. Indirect effects of disruption to subsistence harvests or to biological resources utilized for subsistence include increasing alcoholism, family breakup and conflict, generational conflict and increasing alienation on the part of Inupiat residents, particularly in Barrow. Declining subsistence resources results in substitution of foods which are not as nutritionally balanced or climate-specific as traditional Inupiat foods, further reducing Inupiat well-being.

Conclusions. Given the high probability of discovering recoverable oil and gas resources, and the fact that the subsistence culture is already stressed by the endangered status of the bowhead whale and by other developement in the area, the impact of the proposal is expected to be high to very high.

Cumulative Impacts. In the unlikely event that all areas of the Diapir Field planning area are leased and all resources subsequently are developed over the life of the proposal, the expected number of oilspills is 7.2 spills greater than 1,000 barrels, including 2.2 spills greater than 10,000 barrels. An additional unknown quantity of oilspills is expected to result from tankering from the Canadian Beaufort. An additional unknown number of oilspills also

could occur from development of State of Alaska territorial waters in the Beaufort Sea. Additional projects or activities that could contribute to cumulative impacts in the planning area are development of NPR-A, expansion of the Prudhoe Bay complex, and state and private onshore leasing. These total projects or activities could effect Native subsistence cultures in the following ways. Oilspill damage or other disturbances to local subsistence resources could divert, displace or reduce the availability of subsistence resources. Major disruption in the access to or availability of local subsistence resources where they were traditionally found could disrupt traditional subsistence effort patterns to an extent as to 1) reduce subsistence catch of the resources customarily used, 2) prevent the pursuit of subsistence practices by segments of the population due to the costs of using an increased subsistence range, 3) disrupt traditional (cultural and spiritual) patterns of obligation fulfillment 4) and induce chronic stress and anxiety over imbalances in nature, i.e. the fear of further changes in such relationships, and the inability to do anything about it. Impacts from such effects could include increased disease, malnutrition and mental disorders, family breakup and conflict, substance abuse and generational conflict. Localized impacts could be magnified within the region through the breakdown of customary inter-village (through family networks) resource distribution patterns and obligations. The cumulative impacts of these oilspill events, projects and activities are expected to produce a high to very high impact to native subsistence cultures in the Diapir Field planning area, a significant contribution to this cumulative impact being made by this proposal.

3) Impacts on Other Management Plans

Coastal Zone Management: The North Slope Borough is presently nearing completion of a coastal program for its Prudhoe Bay segment and will extend its planning effort to cover the Arctic National Wildlife Refuge and the National Petroleum Reserve-Alaska. The present proposed plan is geared toward the strictest preservation of the environment, while attempting to provide for the national interest in energy facilities. The next segments will undoubtedly follow suit in terms of borough policy.

The North Slope Borough should have an approved program by early 1983, and will be ready to deal with onshore oil and gas facilities. To what extent they will be permitted is unknown.

Marine Sanctuaries: The Beaufort Sea was once nominated to be a marine sanctuary, but has received no further consideration.

4) Unavoidable Adverse Impacts: Oilspills, discharges of drilling effluents (muds, cuttings, and formation waters) and sewage disposal would result in unavoidable adverse impacts to water quality under the proposal. Impacts from all the above except oilspills could be mitigated by EPA NPDES regulation.

Water supply would be unavoidably adversely affected by this proposal. Limited supplies would be consumed by OCS-related infrastructure and developoment, necessitating new water supply facilities. Existing supplies which may have been used for other purposes may be affected.

The unavoidable adverse impact for land use would be a reducetion in the amount of land available for other uses. Occupation of land by OCS-related activities and structures would be minimal and enclaved.

Coastal ecosystems would be unavoidably adversely affected by oilspills and various discharges as mentioned above for water quality. The level of impact would be restricted both geographically and temporally.

The proposal would have unavoidable adverse impacts on fish by oilspills contacting nearshore habitats or eggs and larvae which occur on or near the surface. Oilspills would also affect commercial fishermen by reducing the number of harvestable fish. These impacts are expected to be minimal.

Birds, marine mammals, and endangered species would also suffer unavoidable adverse impacts from oilspills. The level of impact would depend on when and where the oilspill occured. Regional endangered species consultation with NMFS and FWS is required and would be conducted as needed.

Recreation and tourism resources could be adversely effected unavoidably by damage to visual resources through the intrusion of onshore support infrastructure and road systems, nearshore systems of causeways, pipelines and drilling islands, offshore oil and gas platforms, and vessel and aircraft traffic supporting such operations. Such effects would be localized and may serve as an attraction to a segment of the recreation and tourism population.

Cultural resources offshore, such as housepits, burins, scrapers, arrowheads and other artifacts, could be unavoidably destroyed through OCS operations, but the complex dynamics of the marine environment already may have resulted in the destruction of many of these resources. Cultural resources located onshore could be lost or damaged by public pilfering indiscriminate exposure of artifact sites, construction of causways and pipelines, and new gravel excavation.

Introduction of urban and industrial land uses, except for regional urban centers, would change the character of isolated, de facto wilderness areas, but impacts would be isolated and small in relation to the total area involved. Where urban centers are involved, land use demands generated by OCS activities could unavoidably produce adverse effects derived from the rate and relative scale of demand. Land speculation and price inflation could be experienced as well as interruptions in community facilities and infrastructure during the period necessary for such aspects of land development to catch up with increased land use demands. This may occur in Fairbanks and Anchorage as a result of new employment opportunities.

Native subsistence cultures could be adversely effected directly in an unavoidable way through accidental oilspills and an increase in population, both of which one causal agents which could effect the access to and availability of subsistence resources. Such impacts have been discussed previously. Perhaps more insidious are the indirect adverse effects which could be caused unavoidably by nature of kinship-based social networks existing between regional centers and villages and the periodicity of urban-village migration customary in village regions. Localized effects in villages could have adverse effects throughout the village region. Disruption of customary urban-village migration patterns, through effects such as urban housing

shortages, price inflation or reduced supply of public services, could cause hardship for those segments of the population unable or unwilling to adapt to such changes and contribute to social disorder and disorientation of cultural value systems.

5) Relationship Between Local Short-Term and Uses and Maintenance and Enhancement of Long-Term Productivity: In this section, the short-term effects and uses of various components of the environment are related to long-term effects and the maintenance and enhancement of long-term productivity. The effects of the alternative would vary in kind, intensity, and duration, beginning with preparatory activities (seismic data collection and exploration drilling) of oil and gas development, and ending when natural environmental balances might be restored.

Biological productivity would be lost in the short-term on all onshore lands used in the proposed project. These areas could be returned to productivity in the long-term with proper management. Restoration may not be entirely feasible; however, the overall loss would be a minor adverse effect. The direct land requirements would show in both the short-term and the long-term because of disturbance. Major construction projects would cause definite changes in both the short-term and long-term. Some species may have difficulty repopulating and could be displaced.

Short-term oil pollution and the possibility of long-term cumulative oil pollution impacts could cause serious adverse effects on all components of the marine ecosystem, including fisheries. While restoration would allow fisheries production to regain original levels, any reduced annual harvests during the life of the project would be irretrievably lost. The extent is not known presently, but the potential must be recognized.

Freshwater pollution from onshore activities is a short-term effect. The long-term decrease in water quality amy be considered to be a tradeoff for obtaining oil and gas resources.

The biota would be threatened in the short-term by potential oil pollution. Direct mortality could be significant through the combined effects of harassment by humans and the increased volume and frequency of noise from vessel traffic or overflying aircraft. In the long-term, such distrubances could alter behavior patterns and could drive fauna away from traditional feeding and breeding grounds or to other critical areas within their range, reducing species populations over a long period of time.

Habitat destruction could cause a reduction in subsistence species which could threaten the regional economy. The improved accessibility to primitive areas from increased construction is a short-term result of this alternative. The overall wilderness value of the coast may decrease from increased land use. Increased human populations in the short-term could change the regional Native culture in the long-term. The subsistence way of life could be modified and population shifts could occur. The overall changes cannot be termed positive or negative, except by those affected.

Archaeologic and historic values discovered during development would enhance long-term knowledge. Overall, finds may help to locate other sites, but destruction of artifacts would represent long-term losses.

Consumption of offshore oil and gas would be a long-term use of non-renewable resources. Economic, political, and social benefits may accrue from the availability of oil and gas. Most benefits would be short-term and would decrease the nation's dependency on oil imports.

The production of oil and gas from the planning area would provide short-term, critically needed energy, and perhaps, provide time either for the development of long-term alternative energy sources or substitutes for petroleum feedstocks. Petroleum development in these areas may mean the irreplaceable loss of some fisheries production. The maintenance and enhancement of long-term producitivity would depend on efforts to control water quality levels. Regional planning would aid in controlling changing economics and populations, and thus, in moderating any adverse impacts.

6.) Irreversible and Irretrievable Commitment of Resources

a) Mineral Resources: Resources discovered would be irretrievably consumed.

b) Social Systems: The primary structure of Inupiat social and poeitical organization, culture, and identity is centered around the hunting of bowhead whales, sharing and distributing the hunt, and celebrations, crafts, and related activities associated with whale hunting. Virtually every family on the North Slope is connected to sharing through personal experience in one or more aspects of the whaling complex. While other biological resources could be substituted, if bowhead whales were no longer available, there would be an irreversible and irretrievable loss of culture, meaning, and purpose in Inupiat society. The combined risk of oilspills and other disturbances when combined with other risks to the bowhead whale from Alaskan and Canadian Beaufort oil and gas development and tankering activity, and Bering Sea and Pacific OCS sales which transect the bowhead's traditional migratory routes could contribute to these losses. There will be an accelerated decline in the Inupiat social system which must be considered an irretrievable loss.

c) Biological Resources: General industry activities, such as increased ship traffic, seismic exploration activities, aircraft noise, and land based activities, could displace marine and terrestrial birds and mammals (particularly ringed seal and perhaps caribou) into less favorable environments. This would eventually result in reduced population levels. This displacement could become irretrievable if permanent alterations to the environment and habitat were maintained by man.

d) Endangered Species: Under the proposal, it is possible that endangered whales could be subjected to irreversible direct and indirect effects of oilspills, disturbance due to noise and other human activities, or losses and/or deterioration of habitat due to facility developments. Whether such effects would lead to permanent (irreversible) losses of whale resources is unknown.

b. Alternative I-2

Resource estimates and attendant activities, and oilspill probabilities are the same in the Diapir Field for this alternative as for Alternative I-1. This being the case, impacts resulting from this alternative would be the same as

Diapir

Resource Category	Level of Expected Impacts* Scheduled Sales Only Under Alternative I-1	Cumulative Impacts of All Activities
1. General Impacts		
a. Coastal Ecosystems	low	high
b. Water Quality and Supply		
Water Quality	moderate	moderate
Water Supply	very high	very high
c. Navigation and Shipping	very low	low to moderate
d. Other Uses of the OCS	n/a	n/a
e. Land Use	low	moderate to high
f. Cultural Resources	low	moderate
2. Impacts of Special Concern		
a. Fish and Commercial Fisheries		
Fish Resources	low	low
Commercial Fisheries	low	low
b. Endangered Species		
Cetaceans	high	high
Birds	low	low to moderate
c. Habitats and Resources of Special Concern		
Birds	moderate	moderate to high
Mammals	moderate to high	moderate to high
d. Air Quality	low	low
e. Recreation and Tourism	low	moderate
f. Socioeconomic Factors	low	moderate
g. Native Subsistence Cultures	high to very high	high to very high

* Definitions of level of impact are provided at the beginning of Section V.D.

(This table also applies to Alternatives I-2, II, and IV-1. See text.)

those described for Alternative I-1. In addition, impacts on other management plans and unavoidable adverse impacts would be the same as described for Alternative I-1.

In addition, all other projects and proposals assumed for the cumulative case for Alternative I-1 are also assumed for this alternative. Thus, cumulative impacts for this alternative would be the same as those described for Alternative I-1.

c. Alternative II

Resource estimates and attendant activities, and oilspill probabilities are the same for this alternative as for Alternative I-1. This being the case, impacts resulting from this alternative would be the same as those described for Alternative I-1. In addition, impacts on other management plans and unavoidable adverse impacts would be the same as described for Alternative I-1. The relationship between short-term use of man's environment and long-term productivity for this alternative is the same as that described for Alternative I-1. The irreversible and irretrievable commitment of resources associated with this alternative is the same as described for Alternative I-1.

In addition, all other projects and proposals assumed for the cumulative case for Alternative I-1 are also assumed for this alternative. Thus, cumulative impacts for this alternative would be the same as those described for Alternative I-1.

d. Alternative III-1

Resource estimates and attendant activities and oilspill probabilities are lower by approximately 50% for this alternative than for Alternative I-1. Impacts resulting from this alternative would not be significantly different from those described for Alternative I-1, except for endangered species and habitats and resources of special concern (marine mammals and birds). Effects of OCS oil and gas activities on endangered whale species could be substantially reduced under this alternative. Proposed OCS Lease Sale 71 and the existing federal lease area do not include tracts (blocks) transecting the narrow spring migration corridor of the bowhead whale (location of annual ice lead), nor do these sale areas include tracts in the eastern Beaufort Sea near the bowhead whale major feeding habitat. Some tracts of special concern to endangered species were omitted from leasing consideration during previous tract selection processes. Therefore, potential adverse interactions between endangered species and OCS activities in the Diapir Field planning area may be reduced somewhat under the June 1980 5-Year lease schedule. Because OCS Lease Sales 71 and 97 would offer the entire Diapir Field planning area for exploration and development under Alternative I-1 while this alternative offers just the sale 71 tracts for leasing, potential impacts to endangered species would be substantially reduced from those described for Alternative I-1. Endangered species in the Diapir Field are expected to sustain moderate impacts from the likely effects of OCS activities associated with proposed OCS Lease Sale 71 (see OCS Lease Sale 71 DEIS).

Effects of OCS oil and gas activities on migratory birds and marine mammals particularly the ringed seal could be substantially reduced under this alternative. Proposed sale 71 and the existing federal lease area do not include

tracts all along the Beaufort Sea coast as would be offered under Alternative I-1.

Tract (blocks) adjacent to several highly productive nearshore habitats such as Elson Lagoon, Beaufort Lagoon, and the Canning Rivery Delta area would not be offered for oil and gas exploration and development under this alternative. Geophysical seismic activities on the shorefast ice causing disturbance of ringed seal pupping would be limited to the Harrison Bay-Simpson Lagoon area. Seismic activities and associated disturbance of ringed seals would occur over the entire shorefast ice zone of the Beaufort Sea under Alternative I-1.

For the cumulative case, all other projects and proposals assumed for Alternative I-1 are also assumed for this alternative. Thus, cumulative impacts for this alternative would be the same as those described for Alternative I-1.

e. Alternative III-2

Resource estimates and attendant activities, and oilspill probabilities are the same for this alternative as for Alternative III-1. This being the case, impacts resulting from this alternative would be the same as those described for Alternative III-1. Impacts on other management plans and unavoidable adverse impacts would be the same as described for Alternative I-1. The relationship between short-term use of man's environment and long-term productivity for this alternative is the same as that described for Alternative I-1. The irreversible and irretrievable commitment of resources associated with this alternative is the same as described for Alternative I-1.

For the cumulative case, all other projects and proposals assumed for Alternative I-1 are also assumed for this alternative. Thus, cumulative impacts for this alternative would be the same as those described for Alternative I-1.

f. Alternative IV-1.a.

Resource estimates and attendant activities, and oilspill probabilities for the Diapir planning area are the same for this alternative as for Alternative I-1. This being the case, impacts, including cumulative impacts, resulting from this alternative would be the same as those described for Alternative I-1. In addition, impacts on other management plans and unavoidable adverse impacts would be the same as described for Alternative I-1. The relationship between short-term use of man's environment and long-term productivity for this alternative is the same as that described for Alternative I-1. The irreversible and irretrievable commitment of resources associated with this alternative is the same as described for Alternative I-1.

g. Alternative IV-1.b.

Resource estimates and attendant activities, and oilspill probabilities for the Diapir planning area are the same for this alternative as for Alternative I-1. This being the case, impacts, including cumulative impacts, resulting from this alternative would be the ame as those described for Alternative I-1. In addition, impacts on other management plans and unavoidable adverse impacts would be the same as described for Alternative I-1. The relationship between short-term use of man's environment and long-term productivity for this

Diapir

Resource Category	Level of Expected Impacts* Scheduled Sales Only Under Alternative III-1	Cumulative Impacts of All Activities
1. General Impacts		
a. Coastal Ecosystems	low	high
b. Water Quality and Supply		
Water Quality	moderate	moderate
Water Supply	very high	very high
c. Navigation and Shipping	very low	low to moderate
d. Other Uses of the OCS	n/a	n/a
e. Land Use	low	moderate to high
f. Cultural Resources	low	moderate
2. Impacts of Special Concern		
a. Fish and Commercial Fisheries		
Fish Resources	low	low
Commercial Fisheries	low	low
b. Endangered Species		
Cetaceans	moderate**	high
Birds	low	low to moderate
c. Habitats and Resources of Special Concern		
Birds	low**	moderate to high
Mammals	low**	moderate to high
d. Air Quality	low	low
e. Recreation and Tourism	low	moderate
f. Socioeconomic Factors	low	moderate
g. Native Subsistence Cultures	high to very high	high to very high

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* Definitions of level of impact are provided at the beginning of Section V.D.

** Differs from the proposal.

Diapir

Resource Category	Level of Expected Impacts* Scheduled Sales Only Under Alternative III-2	Cumulative Impacts of All Activities
1. General Impacts		
a. Coastal Ecosystems	low	high
b. Water Quality and Supply		
Water Quality	moderate	moderate
Water Supply	very high	very high
c. Navigation and Shipping	very low	low to moderate
d. Other Uses of the OCS	n/a	n/a
e. Land Use	low	moderate to high
f. Cultural Resources	low	moderate
2. Impacts of Special Concern		
a. Fish and Commercial Fisheries		
Fish Resources	low	low
Commercial Fisheries	low	low
b. Endangered Species		
Cetaceans	moderate**	high
Birds	low	low to moderate
c. Habitats and Resources of Special Concern		
Birds	low**	moderate to high
Mammals	low**	moderate to high
d. Air Quality	low	low
e. Recreation and Tourism	low	moderate
f. Socioeconomic Factors	low	moderate
g. Native Subsistence Cultures	high to very high	high to very high

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* Definitions of level of impact are provided at the beginning of Section V.D.

** Differs from the proposal.

alternative is the same as that described for Alternative I-1. The irreversible and irretrievable commitment of resources associated with this alternative is the same as described for Alternative I-1.

h. Alternative IV-2.a.

There are no impacts anticipated for the Diapir under this alternative because no sales are proposed for this area.

i. Alternative IV-2.b.

There are no impacts anticipated for the Diapir under this alternative because no sales are proposed for this area.

THE MORE SIGNIFICANT ENVIRONMENTAL CONSEQUENCES

Diapir

Resource Category	Level of Expected Impacts* Scheduled Sales Only Under Alternative IV-2	Cumulative Impacts of All Activities
1. General Impacts		
a. Coastal Ecosystems	n/a**	high
b. Water Quality and Supply		
Water Quality	n/a**	moderate
Water Supply	n/a**	very high
c. Navigation and Shipping	n/a**	low to moderate
d. Other Uses of the OCS	n/a	n/a
e. Land Use	n/a**	moderate to high
f. Cultural Resources	n/a**	moderate
2. Impacts of Special Concern		
a. Fish and Commercial Fisheries		
Fish Resources	n/a**	low
Commercial Fisheries	n/a**	low
b. Endangered Species		
Cetaceans	n/a**	high
Birds	n/a**	low to moderate
c. Habitats and Resources of Special Concern		
Birds	n/a**	moderate to high
Mammals	n/a**	moderate to high
d. Air Quality	n/a**	low
e. Recreation and Tourism	n/a**	moderate
f. Socioeconomic Factors	n/a**	moderate
g. Native Subsistence Cultures	n/a**	high to very high

* Definitions of level of impact are provided at the beginning of Section V.D.

** Differs from the proposal.

VI. CONSULTATION AND COORDINATION

A. Development of the Proposal

On December 31, 1980, the Secretary, in accordance with Section 18(e) of the OCS Lands Act, as amended, which requires an annual review of the 5-year schedule, issued a request for comments and information from the Governors of affected States, Federal agencies, and the public on the 5-year program approved in June 1980. On April 13, 1981, after considering comments and information received in response to this request, the Secretary submitted a draft proposed schedule to the Governors of the affected coastal States. The draft proposal was made available for public comment through an April 17, 1981 Federal Register notice.

The changes in the proposed leasing program, to add six (6) additional sales to the program and extend it through 1986, were determined to be a major Federal action. Consequently, in accordance with the National Environmental Policy Act of 1969, as amended, a supplement to the Final Environmental Impact Statement on the original program (FES 80-3) was undertaken to evaluate the relevant environmental consequences of the new action. A Draft Supplemental Environmental Impact Statement (DSEIS) was filled with the Environmental Protection Agency and released to the public on June 5, 1981.

The proposed program was slightly modified as a result of comments received on the draft proposed program and on July 15 the Secretary released the schedule which is considered to be Alternative I in this document's evaluations. The new proposal was submitted to Congress on July 24, 1981.

B. Development and Review of the SEIS

On May 1, 1981, the Bureau of Land Management published in the Federal Register (46 FR24716), a Notice of Intent to prepare a supplemental environmental impact statement on the draft proposed schedule. Comments received in response to this notice, comments received in response to the December 1980 request for comments on the program, comments received in response to the April 1980 draft proposed program, and the FEIS on the original program were reviewed to determine the major scope of analysis and the alternatives to be evaluated in the SEIS. See Chapter I.B.2. for a discussion of Scoping.

The draft environmental impact statement was released and submitted to the U.S. Environmental Protection Agency on June 5, 1981. The comment period for the draft, as established by EPA lasted until August 10, 1981.

The draft was submitted to the following Federal agencies and States for review:

Nuclear Regulatory Commission
U.S. Department of Energy
U.S. Department of Commerce

U.S. Department of Defense
U.S. Army Corps of Engineers (DOD)

U.S. Department of Transportation
U.S. Coast Guard (DOT)
Office of Pipeline Safety, Material Transportation Bureau (DOT)
Marine Mammal Commission
Federal Energy Regulatory Commission
Department of State
U.S. Environmental Protection Agency
U.S. Fish and Wildlife Service
U.S. Geological Survey
U.S. Bureau of Mines
Commission of Indian Affairs

State of Maine
State of New Hampshire
Commonwealth of Massachusetts
State of Rhode Island
State of Connecticut
State of New York
State of New Jersey
Commonwealth of Pennsylvania
State of Delaware
State of Maryland
Commonwealth of Virginia
State of North Carolina
State of South Carolina
State of Georgia
State of Florida
State of Alabama
State of Mississippi
State of Louisiana
State of Texas
State of California
State of Alaska

Copies of the statement were also sent to numerous local governments, environmental groups, industry, and other interested parties.

Public hearings were held during the week of July 20, 1981, in New York, Washington, D.C., New Orleans, Los Angeles, and Anchorage. A total of 102 persons testified at the hearings. In addition, numerous individuals and groups submitted written comments. Following is a list of all testifiers and commenters.

New-York-Public-Hearing

1.	David Kinsey	New Jersey Department of Environmental Protection
2.	Joel Jacobson	New Jersey Department of Energy
3.	Francis Beinecke	NRDC
4.	Derek Bennett	American Littoral Society

Washington, D.C. Public Hearing

5.	E. Joseph Hillings	Florida Exploration Co.
6.	Elizabeth Kaplan	Friends of the Earth
7.	Edwin Rothschild	Energy Action Education Foundation
8.	Elliott A. Norse	Center for Environmental Education
9.	Robert H. Nanz	Shell Oil Company
10.	Sharon Newsome	National Wildlife Federation

New Orleans Public Hearings

11.	Charles C. Bedell	International Association of Drilling Contractors

Los Angeles Public Hearing

12.	William Travis	California Coastal Commission
13.	Connie Parish	Friends of the Earth
14.	Norman DeVall	Mendocino County
15.	Michelle Perrault	Sierra Club
16.	Ira Reiner	Los Angeles
17.	Beth Sparkull	Mendocino County
18.	William Wallace	Santa Barbara
19.	Wesley Chesbro	Humboldt County
20.	Eric Hedlund	Humboldt County
21.	Arthur Spaulding	Western Oil and Gas Association
22.	Honorable Edmund G. Brown	Governor of California
23.	Zev Yaroslavsky	City of Los Angeles
24.	Marvin Braude	City of Los Angeles
25.	Warner Chabot	Marin County
26.	Joe Cuchiara	Santa Cruz County
27.	Deborah Nelson	San Mateo County
28.	Ernie Carpenter	Sanoma
29.	Bert Muhly	Association of Monterey Bay Area Govts.

Anchorage Public Hearing

30.	Honorable Terry Miller	Lieutenant Governor of Alaska
31.	Jacob Adams	Mayor, Barrow
32.	Caleb Pungowiyi	Kawerak, Inc.
33.	Ken Hamm	Nunam Kitlutsisti
34.	Showalter Smith	Association of Village Councils
35.	Paul Lowe	Sierra Club
36.	Margie Gibson	Friends of the Earth
37.	Bruce Apple	National Wildlife Federation
38.	Raymond Neakok	Inupiat Community of the Arctic Slope
39.	Susan Georgette	Anchorage
40.	Thomas Cook	Chevron, U.S.A.
41.	Helga Eakon	Unalakleet Native Corporation
42.	Ron Reed	Anchorage
43.	C.V. Chatterton	Rowan Drilling, U.S., Inc.
44.	Ernie Walston	Rowan Drilling, U.S., Inc.

45.	Doug Garrott	Exxon, U.S.A.
46.	Marilyn Rusmussen	Unalaska
47.	Lucille Holden	Ketchikan
48.	William Brown	Barrow
49.	Fred Eyerly	Alaska Legal Services
50.	Mark Segers	Dillingham
51.	Honorable Eric Sulcliffe	Representative, Aleutian Islands
52.	Mary Litchard	Nome
53.	Louis Schnaper	Alaska Trollers Association
54.	Abigail Dickson	Unalaska
55.	Dennis McBride	Ketchikan
56.	Larry Edward	Sitka
57.	Ron Brower	Native Village Corporation of Barrow
58.	Maria Green	Hooper
59.	Tom Peterson	Kodiak Nation Association
60.	Roy Johnson	Nome
61.	Walt Mattel	Ketchikan
62.	Dan Muller	Sitka
63.	Barry Gross	Ketchikan
64.	Michael Jeffrey	Alaska Legal Services
65.	Cheryl Easterwood	Sitka
66.	Kathleen Lucich	Ketchikan
67.	Melvin Monsen	Bering Sea Fishermen's Association
68.	Helen Hooper	Ketchikan
69.	Linda Freed	Kodiak Island Borough
70.	Marilyn Howser	Anchorage
71.	Marcia Levitsky	Anchorage
72.	Richard Atuk	Bering Straits Native Corporation
73.	Diane Hemmes	Bering Straits Coastal Resources Service Area
74.	Larry Merculieff	Tanadgusix Corporation
75.	Chauntina Boutukofski	Manager, City of St. Paul
76.	Victor McKenna	St. Paul
77.	Harold Sparks	Nunam Kitlutsisti
78.	Mary McKeen	Juneau
79.	Conner Thomas	Nome
80.	Mitch King	Fisherman's Association of Bristol Bay
81.	Margaret Landsburger	Nome
82.	Roger Painter	United Fishermen of Alaska
83.	Robert Rawles	Editor, Bering Straits Newspaper, Nome
84.	Wayne Hall	Anchorage
85.	Lee Stratton	North Pacific Rim
86.	Henry Mitchell	Bering Sea Fishermen's Association
87.	Robert Mintz	Trustees of Alaska
88.	Ron Zobel	Private
89.	Matt Zencey	Alaska Public Interest Research Group
90.	Will Nebesky	Alaska Institute of Social and and Economic Research
91.	Laura Noland	Greenpeace, Alaska
92.	David Findelstein	Anchorage
93.	Sally Kabisch	Anchorage
94.	Dr. Charles Kangisberg	Anchorage
95.	Dave Baumeister	ERA Helicopters, Inc.

96.	Fred Stine	Dutch Harbor
97.	Jane Kanester	Bristol Bay Native Association
98.	Doug Nebert	Private
99.	Dave Spencer	Anchorage
100.	Alan Gaddie	Anchorage
101.	Dave Benton	Friends of the Earth
102.	Cathy Dennerleth	Anchorage

The following is a list of individuals/organizations who submitted written comments.

ORGANIZATION REPRESENTED	NAME
Federal	
U.S. Department of Commerce National Oceanic and Atmospheric Administration, Office of Coastal Zone Management	Robert W. Knecht
U.S. Department of the Interior National Park Service	Ira J. Hutchinson
Dept. of the Army, Corps of Engineers	
New England Division	Joseph L. Ignazio
South Atlantic Division	Dan M. Mauldin
New Orleans District	Col. Thomas A. Sands

ORGANIZATION REPRESENTED	NAME
Federal	
Galveston District	Col. James M. Sigler
North Pacific Division	Col. Robert L. Crosby
U.S. Department of the Interior Geological Survey	Eddie R. Wyatt
U.S. Environmental Protection Agency	William N. Hedeman, Jr.
U.S. Nuclear Regulatory Commission	Daniel R. Muller
U.S. Department of Transportation, Office of the Secretary	Martin Convisser
U.S. Department of Transportation, U.S. Coast Guard	Adm. W. E. Caldwell
Federal Energy Regulatory Commission, Office of Pipeline and Producer Regulation	Kenneth A. Williams
U.S. Department of the Interior, Fish and Wildlife Service	Rolf Wallenstrom
State of Maine, Executive Department, State Planning Office	Holly Dominie
State of New Hampshire Office of State Planning	Ronald Poltak

The Commonwealth of Massachusetts, Executive Office of Environmental Affairs	John A. Bewick
The State of Rhode Island and Providence Plantations Governor's Energy Office	Bruce Wild
State of Rhode Island and Providence Plantations Department of Administration, Statewide Planning Program	Rene J. Fontaine
State of New York Department of Environmental Conservation	Robert F. Flacke
State of New York, Executive Department, Executive Chamber	Gov. Hugh L. Carey
State of New Jersey, Department of Environmental Protection	David N. Kinsey
Commonwealth of Virginia Council on the Environment	J.B. Jackson, Jr.
Commonwealth of Virginia State Water Control Board	Brian Harrison
Commonwealth of Virginia Office of the Governor	Maurice B. Rowe
Commonwealth of Virginia Department of Conservation and Economic Development	D.C. LeVan
North Carolina Department of Administration, Office of Marine Affairs	Eric A. Vernon
State of South Carolina Office of the Governor	Gov. Richard W. Riley
State of Georgia, Office of Planning and Budget	Charles H. Badger
State of Florida, Office of the Governor	Walter O. Kolb
State of Florida Department of Commerce	Wynnelle Wilson
State of Florida, Department of Environmental Regulation	Suzanne P. Walker
State of Florida, Department of Community Affairs	John Burke
State of Mississippi Department of Wildlife Conservation	Richard L. Leard
State of Mississippi Office of the Governor Department of Planning & Policy	George Parsons
State of Louisiana Department of Culture, Recreation and Tourism, Office of Program Development	Robert B. DeBlieux

The State of Texas, Office of the Governor, Budget and Planning Office	Leon Willhite
The State of Texas, Air Control Board	Roger R. Wallis
State of Texas, Parks and Wildlife Department	Charles D. Travis
State of Texas, Department of Water Resources	Harvey David
State of Texas, Department of Highways and Public Transportation	M.G. Goode
State of California, Governor's Office	Gov. Edmund G. Brown, Jr.
State of California California Coastal Commission	Michael L. Fisher
State of California Office of Planning and Research	Deni Greene
State of Washington Department of Ecology	Duane Wegner
State of Alaska Office of the Governor Division of Policy, Development and Planning	James M. Souby
State of Alaska, Department of Natural Resources	Robert D. Shaw
State of Alaska, Department of Transportation and Public Facilities	Kit Duke

Local Governments

Florida

Tampa Bay Regional Planning Council	Zeb Palmer
Southwest Florida Regional Planning Council	Roland H. Eastwood
South Florida Regional Planning Council	M. Barry Peterson
East Central Florida Regional Planning Council	Cliff Guillet
Withlacoochee Regional Planning Council	Hebert H.W. Heesch

Alaska

Bering Straits Coastal Resource Service Area Board	Diane Hemnes

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Bristol Bay Native Association	Jay Koenitzer
City of Kaktovik	Archie K. Brower
Mauneluk Association	Peter C. Gamache
North Slope Borough, Office of the Manager	Jacob Adams
Tanana Chiefs Conference Inc.	William C. Williams
City of Alaska	Richard Careaga
City of Unalakleet	Herbert Ivanoff

California

Monterey County Board of Supervisors	Barbara Shipnuck
County of Santa Cruz	Gary A. Patton
Association of Monterey Bay Area Governments	D. Dan Forbus
County of San Mateo Planning and Development Division	David C. Hale
County of Ventura	Victor R. Husbands

Massachusetts

Nantucket Land Council, Inc.	John H. Roe

Groups

Sierra Club, National Coastal Committee	Shirley Taylor
The Sanibel Captiva Conservation Foundation, Inc.	George C. Tenney
Natural Resources Defense Council, Inc.	Francis Beinecke
Pacific Alaska LNG Associates	Len McLean
Sierra Club	Michele Perrault
Unalakleet Native Corporation	Helga Eakon
Norton Sound Fishermen's Cooperative	R. Weaver Ivanoff
National Aubudon Society, Alaska Regional Office	Robert B. Heasley
National Wildlife Federation, Alaska Natural Resource Center	Bruce N. Apple
Bristol Bay Native Association	Jane Koenitzer
Rural Alaska Community, Action Program, Inc.	Jude Henzler
Choggiung Limited	Trudy Ward
Alaska Public Interest Research Group	Matthew Zencey
Bering Sea Fishermen's Association	Mel Mansen
United Fishermen of Alaska	Roger Painter
Center for Environmental Education	Michael Weber
National Wildlife Federation	Jay D. Hair
Friends of the Earth, Alaska Office	

Whale Center	Maxine McCloskey
Defenders of Wildlife	Sherrard C. Foster
Get Oil Out	Ellen Sidenberg
Pacific Palisades Property Owners Association, Inc.	Rubell Helgeson
Natural Resources Council of Maine	Jerry A. Bley
Exxon Company, U.S.A	D.G. Garrett
Alaska Oil and Gas Association	William W. Hopkins
Alaska Eskimo Whaling Commission	

Private

Mary and Norman Theberg	Florida
Mrs. Charles Martin	Arizona
Amy Nathan	New York
Mrs. E. Stewart Taylor	Colorado
H. Carroll	California
June K. McCoy	California
Thomas Rinaldi	California
John & Dorithy Petesen	California
Steven R. Hall	California
Cassie Scott	California
Barbara Ahochmund	California
Matt Thomson	California
Cynthia W. Ashmun	Oregon
Gregory W. Fox	Alaska
Bonnie L. Thie	Alaska
Penny Bates	Alaska
Alan Seegert	Alaska
Sandra G. Molloy	Alaska
Kristine Benson	Alaska
Jerry Listowski	Alaska
Patricia L. Cockrell	Alaska
Lee M. Schmidt	Alaska

Comments received from Federal, State, and local agencies are reproduced at the end of this section, with the exception of portions of comments which are too lengthy to be included or where an agency indicated that it did not wish to comment. Copies of all comments which are not reproduced here are available from the Bureau of Land Management (622), U.S. Department of the Interior, Washington, D.C. 20240, or from the OCS Offices.

All comments received were reviewed and analyzed to determine whether changes in the DSEIS were necessary. Where minor, technical changes were required, they were made in the text, without acknowledgment. Following is a summary of the major issues raised by commenters and testifiers, and responses to these issues, including where appropriate, an indication of whether and where the issue resulted in changes in the SEIS.

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SUMMARY OF ISSUES

a. Comments Regarding the Proposal

ISSUE NO. 1: Many reviewers offered comments on NEPA documents that would be prepared under streamlined procedures. Some commented that shortened preparation time, coverage of entire planning areas, and lack of tract specific environmental and geohazard data may render area-wide NEPA documents inadequate. Concern was expressed that modelling efforts would be precluded and that eliminating consideration of a range of resource estimates would reduce the usefulness of the documents. Some commenters requested clarification of the term "NEPA document," Concern was expressed that if the pre-sale NEPA document emphasizes only the exploratory phase, major potential impacts may not be disclosed prior to a lease sale decision. Many commenters felt that tiering does not adequately take into account the "snow balling" effect once industry makes financial commitments.

RAISED BY: California, Sierra Club and Sierra Club-National Coastal Committee, Friends of the Earth, New York, NRDC, National Resources Council of Maine, Whale Center, South West Florida RPC, Sanibel-Captiva Conservation Foundation, North Carolina, New Jersey, Wildlife Federation, FERC, South Carolina, Audubon Society, Alaska, North Slope Borough, Kaktovik.

RESPONSE: The Department plans to ensure that NEPA documents prepared under streamlined procedures for area-wide offerings will comply with the requirements of NEPA and provide the public and decisionmakers with the necessary environmental information regarding lease sale decisions. Although preparation time for the documents has been shortened, the focusing of the documents on planning area-wide offerings allows an earlier commencement of scoping and information gathering efforts since planning area boundaries are already known.

The availability of planning area-wide resource estimates and environmental information will provide an early start at

necessary modelling efforts which will be refined as the scoping and environmental analysis progress. The area-wide

NEPA documents will consider not only the potential impacts of planning area-wide exploration and development, but will also consider the likely levels and location of exploration and development that may result from a particular lease sale. See Chapter II of the FSEIS for a detailed description of the NEPA document preparation process as proposed. An EIS need not be encyclopedic nor inordinately detailed to be legally adequate and of use to the decisionmaker. It must, however, be a good faith, objective effort which sets forth sufficient information to enable the decisionmaker to consider fully the environmental impact of reasonable alternatives, and to make a reasonable decision after balancing the risks of harm to the environment against the benefit to be derived from the proposed action. The OCS decisionmaking process is a sequential one which does not end with the lease sale decision. Further analyses are required prior to approval of exploration plans and development and production plans. This alleviates the need for complete, exhaustive information prior to the lease sale.

It is anticipated that the first NEPA document in each planning area would be an EIS. As noted above, it would consider the possible impacts of area-wide exploration and development as well as potential impacts of the probable result of that particular lease sale. Prior to any decision on subsequent sales in a planning area, a determination would be made, in accordance with NEPA and its implementing regulations (40 CFR 1500-1508), as to the NEPA documentation required. Tiering would thus be used when appropriate to reduce unnecessary duplication and paperwork, and to focus on issues ripe for decision.

Regarding the "snowball effect" referred to in the comment, every attempt will be made under the proposed program, as is done under the current program, to make potential lessees aware of potential environmental concerns prior to a sale. Potential lessees, before they invest in a lease, are of course, aware of the various permitting processes and the authorities of the Secretary to ensure safe exploration and development once a tract has been leases. We would expect a potential lessee to take these factors into account prior to bidding on a lease or investing in its exploration and development

ISSUE NO. 2: Several reviewers expressed concern that streamlining the pre-lease planning process, especially elimination of tract selection and pre-lease collection of geohazard data, would reduce environmental safeguards, such as tract deletion and tract specific stipulations. Two commenters asked what criteria would be used for tract deletion under the area-wide offering concept.

RAISED BY: Friends of the Earth, NRDC, Whale Center, Sierra

Club-National Coastal Committee, National Audubon Society-Alaska Chapter, New Hampshire, New Jersey, South Carolina, California, Alaska, North Slope Borough, NOAA.

RESPONSE: Proposals to streamline the pre-lease planning process were developed primarily through identification of inefficiencies in the existing system. These proposals will not change in any way the environmental safeguards of the OCS program.

Under the streamlined process, deletion of tracts from planning areas considered for leasing may occur at four points. First, Call for Information will exclude any portion of a planning area which is known not to be available for oil and gas leasing. The statutorily excluded area off Point Reyes National Seashore is an example of this type of exclusion. Second, tracts that we know cannot be leased in the timeframe of this sale may be deleted at the Area Identification stage, based on such considerations as national defense or security, for example. Third, tracts may be deleted in the proposed Notice of Sale. This notice will be issued the same month as the final NEPA document, and environmental or other concerns raised during pre-sale planning may result in specific tract deletions at this step. Finally, after the State review guaranteed under section 19 of OCSLAA is completed, tracts may be deleted pursuant to recommendations from a Governor or the executive of an affected local Government if the Secretary determines that these recommendations "provide for a reasonable balance between the national interest and the well-being of the citizens of the affected State."

The criteria used for tract deletion have in the past varied from sale to sale and among groups of tracts, depending on the situation. Although the areas to be considered are likely to be larger under area-wide offerings than they have been in the past, we do not expect any significant differences in the sorts of issues that are considered. These issues come from the environmental impact statement or other studies or pre-sale planning steps; from the Governors' comments on size, timing and location; from BLM hearings or written comments on NEPA documents; from comments on the proposed Notice of Sale; etc. Thus, the process for developing and applying criteria for tract deletion remain unchanged.

USGS will continue to provide information from regional geohazard studies for use in preparing the pre-sale NEPA document, writing lease stipulations, and guiding post-sale decisions by identifying hazards and geological processes on a broad scale. The very detailed tract-specific geohazard information required of lessees prior to approval of exploration development and production plans together with USGS

regional information will be used by USGS in evaluation of both types of plans to make sure that proposed operations are properly designed and safe. Essentially, this recognizes that, with or without streamlining, USGS requires, under OCS operating orders, that detailed, site-specific bottom surveys be conducted prior to initiation of operations affecting the seabed. The amount and location of data required will depend upon the state of knowledge about geohazards in any particular sale area. This approach avoids duplication of data-gathering over leased tracts and needless acquisition of data over tracts not sold. The USGS will continue to require whatever steps are necessary to assure safe operations, including drilling locations outside of hazard zones. We believe this is a much more efficient and effective approach, because, if appropriate or necessary, as guided by data from the regional studies, we will require operators to collect more detailed information than was gathered through pre-sale studies conducted by USGS in the past.

We do not believe that elimination of tract selection as a pre-sale milestone will reduce the Department's ability to impose environmental safeguards including lease stipulations. A significant amount of environmental information will be available before the lease sale and can be used to develop stipulations to protect, for example, fisheries and sensitive canyon head areas. The Call for Information will provide an opportunity, as the Call for Nominations and Comments has in the past, for interested parties to delineate areas of concern where specific stipulations should be imposed. These areas will then be further analyzed and the stipulations proposed, as appropriate, during the environmental assessment process. While planning areas will be larger than areas normally included in a Call for Nominations and Coments, current and past Call areas have nonetheless been very broad. Because the area proposed to be offered will be identified in advance, analysis may begin earlier for such areas.

ISSUE NO. 3: Several commenters questioned whether the safety of OCS operations would be assured under acceleration of the schedule and leasing of increased acreage. Concern was expressed that scattered leases would reduce the Government's enforcement capabilities.

RAISED BY: Sierra Club, Friends of the Earth, NRDC, Sierra Club-National Coastal Committee, North Carolina, California, South Carolina, Alaska.

RESPONSE: The acreage leased and the locations of exploration and development activities will depend, as under the current program, upon industry's willingness to obtain leases, and upon the location and quantities of oil and gas that are eventually discovered.

It is required by law, Section 22(c)(1) of the OCS Lands Act, as amended, that all OCS facilities be inspected at least once each year. In addition, there are numerous unannounced inspections of these facilities. It is also required, prior to the commencement of any operations by a lessee, that plans for such operations be submitted for review and approval by the Minerals Management Service (MMS). There is nothing in the proposed streamlined program which would serve to lessen these strict requirements. The OCS oil and gas program has an excellent safety record. The Department is committed to maintaining and improving this excellent record and to continued vigilance and strict enforcement of measures to ensure safety and environmental protection.

ISSUE NO. 4: Many reviewers were concerned that shortening the NEPA process and other elements of the streamlined procedures, as well as the acceleration of the schedule, would reduce effective public participation by placing too great a burden on reviewers and not allowing adequate time to evaluate information and proposals.

RAISED BY: Virginia, Florida, California, S. Florida RPC, San Mateo County, Friends of the Earth, Whale Center, North Pacific Rim, McCoy.

RESPONSE: The streamlined pre-sale planning process provides as many opportunities as there have been in the past for all interested parties to comment and participate. (While the size of each sale proposal may broaden the scope of State and other interested parties review, all of the opportunities for review remain.) Some of the proposed streamlining steps, such as area-wide NEPA documents, followed by supplemental NEPA documents covering information gathered since the first EIS was prepared, will serve to ease the paperwork burden and should improve the States' and other interested parties' abilities to review the sales within a comprehensive framework. Also, since the area of pre-sale study will be known well in advance once the 5-year program is adopted, interested parties need not await the Call and Area Identification milestones before they start their reviews. Finally, the option of offering only geologically favorable acreage should facilitate State and local government participation.

ISSUE NO. 5: Many reviewers expressed concern about the availability of environmental information from BLM's environmental studies program under the new procedures. Several commenters felt that the studies' funding should not be reduced when the leasing program itself is being greatly accelerated. Some commenters recommended that environmental studies should be timed to provide input into lease sale EIS's. It was also recommended that the SEIS should discuss in more detail the level of effort and resources which will be shifted to post-lease studies.

RAISED BY: New York, Whale Center, North Carolina, Sierra Club-National Coastal Committee, Wildlife Federation, Florida, California, South Carolina, Audubon, Alaska, PIRG, Thie, Eskimo Whaling Commission (re bowhead whale research), NOAA

RESPONSE: Chapter I.4.a.(4) "Environmental Studies Program," has been changed to better reflect the position of studies in the new streamlined leasing system.

ISSUE NO. 6: Some commenters objected to the increase in leasing and acreage because of the associated increase in impacts.

RAISED BY: Monterey County, New Hampshire.

RESPONSE: The proposed streamlined program will result in more acreage offered for lease, but the amount of acreage leased under this proposed program will depend on industry's judgment as to the oil and gas potential of particular portions of the OCS and on their willingness to invest in the opportunity to explore for these resources. If the proposed program results in a higher level of exploratory activity and the discovery and development of greater amounts of oil and gas, there will be a higher potential for impacts. However, prior to a decision on any proposed lease sale, these impacts are evaluated, measures to mitigate any potential adverse effects are formulated, and the public is given the opportunity to review and comment on each proposal.

ISSUE NO. 7: Many commenters expressed the view that the proposal placed too much emphasis on oil production and not enough on other values. Several cited this as a violation of OCSLA section 18 requirements to balance energy needs with other factors.

RAISED BY: Defenders of Wildlife, National Wildlife Federation, Sierra Club and Sierra Club - National Coastal Committee, Whale Center, San Mateo County, Monterey County, Nantucket Land Council, North Slope Borough, Alaska PIRG, Alaska, New Jersey.

RESPONSE: The mandate of the OCS Lands Act Amendments of 1978 (OCSLAA) is to expedite OCS activities so that domestic oil and gas reserves can play an increased role in national energy policy. The Secretary's starting point for establishing the proposed leasing program was this mandate to meet national energy needs.

The Secretary construes section 18 of the OCSLA as a clear and repeated call for expedition in the leasing and management of the OCS. Moreover, the Congress mandated that the areas on the 5-year schedule would be the maximum areas available for consideration for leasing during the 5-year period. Thus, the schedule is the umbrella under which subsequent detailed decisions on leasing and managing particular OCS areas will be

made. Only by including areas on a planning schedule can the Department assemble information to determine how to proceed on future steps in particular areas. After such planning and throughout the lifetime of an OCS field, activities can be controlled, modified, delayed or cancelled as necessary to carry out the environmental protection elements of OCSLA.

The balancing requirement of section 18(a)(3) of the OCSLA is that a "proper balance" be struck between "the potential for environmental damage, the potential for the discovery of oil and gas, and the potential for adverse impact on the coastal zone." However, the Act neither requires that environmental and coastal zone considerations receive equal weight with the potential for discovery of oil and gas nor mandates any particular balance. California v. Watt, No. 80-1894 (D.C. Cir. October 6, 1981) Slip Op. at 52. The Administrative Record for Secretary Watt's 5-year program will show that "this proper balance" has been struck.

ISSUE NO. 8: Several commenters indicated that the proposal to increase acreage offered would not result in increased exploration or even in increased acreage or thought that the emphasis should be on evaluation of promising acreage rather than on quantity offered. It is suggested that frequent changes in the Federalgovernment's OCS planning schedules are disruptive to industry's planning efforts.

RAISED BY: Center for Environmental Education, Sierra Club-National Coast Committee, Get Oil Out, NRDC, California, Alaska, North Slope Borough, Alaska PIRG

RESPONSE: We expect more acres to be leased under the proposed program that would have been the case under the June 1980 schedule. However, we do not expect the proposal will result in massive amounts of acreage being leased because the emphasis in this new program is quality, not quantity. We expect that industry will only bid on a small portion of the total acreage offered over the next 5 years. The small portion will, however, be the most promising in the eyes of the full spectrum of industry scientists rather than in the judgement of the Federal government. Because more high quality acreage will be offered sooner, development opportunities will be improved and the pace of exploration will increase and become more efficient. It has been suggested by some that a change in the OCS planning schedule may be disruptive to industry's planning efforts. However, we feel that the proposed new leasing program, rather than disrupting planning efforts, will serve to encourage offshore exploration by streamlining the leasing system, removing unnecessary restrictions on the amount of acreage considered for leasing, and making available earlier the more prospective areas of the OCS.

ISSUE NO. 9: Several reviewers commented that the proposal is not in compliance with the Section 18 requirement to define sale size and location "as precisely as possible."

RAISED BY: New Hampshire, South Carolina, San Mateo County, North Pacific Rim.

RESPONSE: The court decision on the 5-year program approved by Secretary Andrus in June 1980 (Calfornia vs. Watt, No. 80-1894 (D.C. Cir., October 6, 1981) found fault with the designation of sales #73 and #80 as "California." This fault in the June 1980 program was corrected in the July 1981 proposed program. The Department is examining the court opinion carefully to determine if any changes are needed in other sale designations.

ISSUE NO. 10: Several reviewers suggested offering smaller areas. EPA suggested breaking up planning areas that include more than one geologic basin by considering other values and uses such as shipping or fisheries. California suggested limiting each sale to one sedimentary basin. New Hampshire recommended that the North and Mid-Atlantic planning areas not be combined. NOAA suggested dividing the Arctic into three sub-areas and offering each in a separate sale.

RAISED BY: New Hampshire, California, North Slope Borough, EPA, NOAA

RESPONSE: We believe that either area-wide offerings using the planning areas delineated in the proposal or offering all geologically favorable acreage would provide the most efficient means to reverse recent declines in oil production from the OCS. The rationale behind area-wide offerings is as follows:

° Significant domestic energy resources are believed to be located on the OCS, but the precise quantities and locations are unknown because promising frontier areas have not been explored adequately.

° Different geologists have different views on the probable location of oil and gas in any one planning area.

° The best way to accelerate discovery of significant oil and gas deposits is to encourage to pursue unique and diverse exploration strategies based on these different views.

° In the current system the Federal government makes judgments about which tracts are or are not likely to be bid on. The proposed system will allow companies to concentrate their efforts on tracts they consider most promising, unless those tracts have been deleted through the pre-sale planning process.

° The diverse exploration strategies which will be tested under the new system are necessary in order to fully test an area. Only a small percentage of a planning area will contain economically producible resources and it may slow the geologic

delineation of an area if portions of it are made available on a piecemeal basis.

The history of the search for hydrocarbons contains many examples of years of fruitless drilling in a region, then suddenly a commercial find, followed by continued successes. Prudhoe Bay in Alaska, the Hibernia field in the Canadian Atlantic, and the North Sea are all prime examples of this scenario. We believe that by broadening the range of possibilities from which industry can select we will expedite this process in those OCS areas where commercial deposits of hydrocarbons may eventually be found.

ISSUE NO. 11: A number of commenters expressed the belief that capital, equipment, and manpower constraints would render the offshore industry incapable of responding to expanded lease offerings in a safe and efficient manner.

RAISED BY: Center for Environmental Education, Whale Center, Wildlife Federation, Defenders of Wildlife, Audubon, New Hampshire, Virginia, South Carolina, Florida, Alasks PIRG.

RESPONSE: There is no requirement that the offshore industry "keep pace" with expanded OCS lease offerings. Firms are free to decide how much to expand their acquisition of leases and exploratory drilling. Leasing and drilling will only increase to the extent that firms decide that the opportunities are sufficiently attractive to warrant incurring the costs of more equipment and personnel.

If firms judge additional OCS opportunities to be profitable, they will allocate the capital, equipment and manpower to OCS opportunities instead of less promising investments. If these OCS opportunities are sufficiently attractive, new capital will flow into OCS exploration, new equipment will be ordered and built, and new employees will be trained. Neither the leasing schedule nor the actual leasing that result are constrained by fixed levels of capital, equipment and manpower. Rather, OCS opportunities will compete for these resources in the marketplace with other investment opportunities, receiving as much as their promise warrants. One of the strengths of a free market economy is the capability to shift resources into higher payoff projects. The advance notice provided by the 5-Year Leasing Program of the increase in the acreage to be offered will allow industry time to plan its response.

It costs society very little to make additional opportunities for OCS exploration available to industry. If such opportunities are not attractive enough to draw investment, they will go unleased or unexplored. The fact that many tracts that are offered are not leased, and many

that are leased are not explored, does not mean that program is inefficient because relatively little of our economy's scarce resources are used on unexplored tracts. The greater inefficiency is to substantially delay our economy's investment in potentially high payoff opportunities. The cost of such delays is a significant decrease in the income which OCS development yields in the U.S. economy.

Nothing compels a lessee to move forward at such a rapid pace that operations cannot be conducted safely. (Often, there are five to eight years between exploration and eventual production.) In fact, even if a lessee wished to rush headlong into such investments, it would be restrained by both the substance of the applicable environmental and safety regulations and the time required to comply.

In our request for comments on the draft proposed program, we asked industry members to comment specifically on their ability to respond to larger offerings. Of the companies responding to the question, a majority believed that manpower, capital, rigs, etc., will be attracted to opportunities which afford return commensurate with risk. "Industry is fully capable of expanding offshore oil and gas operations," according to the National Ocean Industries Association (NOIA), the only national trade association that represents all facets of the offshore industry. NOIA was "absolutely confident that industry can expand and is anxious to do so."

In regard to drilling capacity specifically, other than initial spot shortages, we do not foresee a real problem with the drilling industry's ability to respond to the pace and size of Federal oil and gas lease offerings. As long as there is a well defined, predictable program, we are confident that capital will flow and rigs will be constructed. The International Association of Drilling Contractors (IADC), an organization representing over 900 drilling contractors, fully expects its affiliated members to gear up and respond favorably to the program. According to the IADV, 223 mobile offshore drilling units are under construction currently and 100 of these are projected for delivery in 1981. Further, the IADC notes that shipyards producing mobile offshore drilling units rose from 29 in January of 1978 to 60 in 1981 and should number 89 by 1983. Also, according to NOIA, "construction contracts for new rigs committed for by the industry total $10 billion one-third of that dollar amount for speculative rigs--those that currently have no drilling contracts." To alleviate short-term spot shortages, we anticipate, as do numerous oil companies, a considerable number of the offshore rigs presently employed outside the U.S. to return to the U.S. Outer Continental Shelf.

ISSUE NO. 12: Some commenters felt increased acreage and other aspects

of area-wide offering and streamlining would result in lower bids, decreased competition and, possibly, failure to receive fair market value or to bring a fair and equitable return to the public.

RAISED BY: Virginia, Florida, California, Alaska, Friends of the Earth, Wildlife Federation, Sierra Club -- National Coastal Committee, Rural Alaska CAP.

RESPONSE: It is likely that substantially expanded leasing will result in lower bids on average and perhaps lower bids for some tracts than they would bring under a more restrictive leasing program. Under the tract selection system, most of the tracts offered for bid are the ones for which there is an industry consensus on their promise. Under the area-wide concept, additional tracts will be available, many of which will be viewed as less promising. These latter tracts are likely to receive lower bids than the more promising tracts, which will have the effect of lowering the average bid. If increased leasing raises input prices, as one commenter claimed, then the higher expected costs will mean lower bids. Bids may also be lower because firms adding tracts to larger lease portfolios will expect smaller gains in total portfolio value than when adding tracts to smaller portfolios. Expanded lease offerings are also likely to result in more tracts receiving only 1 or 2 bids and perhaps even in fewer bids on the better prospects. These consequences understandably raise concerns that achieving the objectives of the OCS program fair market value requirement. These objectives deal with the issue of who benefits from OCS development as opposed to issues that influence how large the benefits will be. Their achievement has been considered in the process of developing the Proposed 5-Year Leasing Program. Although lower bids and less intense competition on some tracts is likely, the fair market value requirements will be met.

Fair market value is a legal minimum for assessing value in transactions involving the government. Under the fair market value requirement, the price that would be established in a fair, competitive market is the relevant standard. Since market prices reflect a wide variety of factors that influence supply and demand at a given time, such factors may also influence the fair market value of the mineral rights conveyed by OCS leases. In particular, the supply of leases as determined by the 5-Year OCS Leasing Program would be a valid influence on their fair market value.

The leasing process must yield a market that is capable of revealing prices in fair transactions. The sealed competitive bidding process, backed up by the government's evaluation and rejection of inadequate bids, meets this requirement.

Lease prices could be increased by restricting their supply. Such a policy could clearly result in prices that would be higher than those in a market in which supply is competitively determined. It would, however, be tantamount to exertion of monopoly power by the government. Losses to the economy would result just as they do from private monopolies. It would be very costly to the Nation to assure receipt of fair market value by exercising the government's monopoly over the supply of OCS leases.

ISSUE NO. 13: Several commenters questioned the need to amend the existing program, citing the belief that it is working well, is well balanced, or is already too ambitious. Others questioned whether economic or energy conditions justify change or whether this much emphasis on production of oil is wise. Also questioned was whether an inventory of OCS oil and gas resources is authorized by OCSLAA.

RAISED BY: Maine, New Jersey, Virginia, California, Alaska PIRG, Nantucket Land Council, NOAA, McCoy, Get Oil Out, Rural Alaska CAP, National Wildlife Federation.

RESPONSE: The legally required annual review of the June 1980 program, which was started in December 1980 and completed in February 1981, led to a determination by Secretary Watt that the program needed to be changed. We believe that the June 1980 leasing program falls short of making a proper contribution to our national energy effort because it will not lead to rapid enough location and assessment of our offshore oil and gas resources. See 43 U.S.C. 1802(9) (Supp. II 1978). The proposed 5-year program will not only increase the pace of this inventory, but it should also result in a more complete and efficient effort. Recent history clearly shows the need for this change. In the past 10 years, there has been only one commercial discovery in a frontier area-- the Beta Field off southern California. We can and must do better. Our current estimates indicate that there are significant amounts of undiscovered hydrocarbon resources on the OCS -- up to 43.5 billion barrels of oil and 230.6 trillion cubic feet of gas. In 1980, we imported an average of 6.2 million barrels of oil a day at a total cost of $78.6 billion for the year, up from $4.6 billion in 1972 and $32 billion in 1976. Because OCS oil and gas costs the Nation much less than imports, the economic losses generated by this huge oil import bill can be reduced by finding more
hydrocarbons and realizing the significant economic gains from their production.

During the period that the cost of imported energy has increased by huge amounts, we have seen oil production from OCS lands steadily decreased. Annual OCS oil production declined from 418 million barrels in 1971 to 277 million barrels in 1980, a 33 percent decrease. While OCS gas production has been steadily increasing, it declined slightly in 1980 to 4.64

trillion cubic feet. These declines are unnecessary and unacceptable. Over several years, faster leasing of the more promising areas under our streamlined system could reverse this trend.

The mandate of OCSLAA is to expedite OCS activities so that domestic oil and gas reserves can play an increased role in national energy policy. See 43 U.S.C. Section 1802(1) (Supp. II 1978). The Secretary's proposed program was developed with this mandate in mind. We believe the concept of inventorying the OCS is not only consistent with the law, but necessary to fulfill congressional purposes in enacting the OCSLAA. See 43 U.S.C. 1802(9) (Supp II 1978).

ISSUE NO. 14: Objection was raised to issuing the proposed program prior to consideration of comments on the DEIS.

RAISED BY: NRDC, Kaktovik

RESPONSE: In April 1981, the Secretary issued a tentative proposed leasing program. This proposal was used as a basis to begin preparation of a DSEIS, which was released in June 1981. Concurrently, and in accordance with section 18(c)(3) of the OCS Lands Act, as amended, a proposed leasing program was formulated, giving consideration to comments received on the tentative proposed program. The proposed program, which was submitted to Congress and the Government of affected States in July 1981, included a few changes in the lease sale schedule. Both the proposed leasing program and the DSEIS were released in order to make Congress, State and local Governments, and the public aware of the significant changes proposed for the OCS leasing program and the potential environmental impacts of the proposal and to solicit comments on the proposal. Although there were differences in the proposed action as defined in the DSEIS and the July proposed program, comments on both the DSEIS and the July proposed program have been given thorough consideration in the preparation of the FSEIS.

Ample opportunity has thus been provided in accordance with procedures defined by NEPA and the OCS Land Act, as amended, for all affected parties to participate in the review and development of the proposed leasing program. In accordance with 40 CFR 1502.5, the preparation of the SEIS was begun early enough so that it could serve practically as an important contribution to the decision making process. As required by law, the FSEIS will be completed and made available to the public prior to a final decision on the program.

ISSUE NO. 15: The suggestion was made that States participate with DOI in development of resource estimates, in order to arrive at a mutually accepted resource estimate on which to base environmental analysis and planning efforts.

RAISED BY: California

RESPONSE: The USGS endorses close cooperation with affected States regarding the development of pre-sale resource estimates. In fact, in the past, the USGS has solicited, through the Association of State Geologists, State participation in regional assessment process. However, the OCS Lands Act, as amended, and existing regulations govern the extent to which proprietary information can be shared with States.

ISSUE NO. 16: Several commenters made suggestions about bidding systems. California suggested a system which requires pre-sale hazard and resource information. NOAA recommended a bid commitment system. The S. Florida RPC was concerned that front end cash bidding will lead to speculation.

RESPONSE: The bid commitment system would have the bidders enter into a contract to acquire a lease, contingent upon a satisfactorily outcome of environmental analysis on that tract. This analogous to a contract to purchase a house contingent upon satisfactory inspection. Its major advantage would be the ability to focus environmental analysis on those tracts actually receiving bids rather than all tracts offered.

There are, however, several major disadvantages to the bid commitment system. If rejection of a bid based on environmental conditions of the tract is a possibility firms may be less willing to expose their proprietary evaluation of the tract's value and tie up funds for the period of the evaluation. This would tend to decrease the bids received. If there is little chance of bid rejection for environmental reasons then the value of the bid commitment procedure would seem slight.

New sale procedures have been carefully developed to assure the integrity of transactions involving billions of dollars. It is crucial to avoid opportunities for favoritism in the acceptance of bids as much as possible. Even though such opportunities are not acted upon, where the leasing of all tracts is subject to this opportunity, the public perception of the integrity of the sale procedures could decline with serious consequences for the success of the program as a whole.

On balance, it appears that improved coordination in matching oil and gas resource information with environmental information during the presale planning process is a preferable way to control the costs of environmental analysis.

The possibility of "speculation" as used in the pejorative sense, is not unique to the front end, cash bonus bid approach, but can emerge under any system where there is a potential for rapid increases in value due to changes in external conditions. In fact, because the cash bonus bid must be paid in advance and, once paid, can become a tax write-off if the tract is

abandoned, this approach is the least susceptible to speculation. Royalty bidding and variable net profit share bidding with their low bonus payments are far more attractive to "speculators."

Speculation in itself, devoid of any deceit or manipulation, is the economic tactic of acquiring a commodity or property to hold in anticipation of increases in its value. In many situations, the effect of such speculation is to save from present supply when prices are cheap so that the future supply when prices are higher will be greater. This smoothes the rate of consumption and dampens the swing of prices.

With regard to the OCS leasing program, the question of "speculation" becomes a question of who should hold OCS tracts during a period of exploration that could increase or decrease their value. The government could "speculate" by withholding tracts from leasing. Or private firms may speculate by acquiring tracts under expanded leasing with the expectation that early exploratory drilling nearby will reveal which tracts are good prospects to be drilled or assigned and which are poor prospects that should be abandoned.

From the viewpoint of the basic objective of the OCS program, which is to increase the contribution to the U.S. economy made by yet to be discovered OCS and gas resources, the important question is whether tracts will be available for exploratory drilling whenever they become sufficiently attractive to draw the necessary investment. Expanded lease offerings may lead to larger private portfolios of OCS tracts from which tracts can be drawn quickly when they are judged to be worthwhile for investment in drilling. On the other hand, expanded lease offerings with sequential sales in each planning area will assure that any tract in the government's portfolio will be available for drilling reasonably soon after it is judged to be ripe for drilling. In fact, the extent of buildup of private portfolios in initial lease sales will be limited by knowledge that tracts will be readily available in later offerings but would be increased by expectation that later offerings would be restrictive or that value of tracts may increase. Thus, an OCS leasing program of expanded, sequential offerings is a good means of promoting efficient exploration and increasing the income which development of OCS resources yields in the U.S. economy.

Concerns about speculation often arise because of the expected distributional effects, that is, because of who will reap the benefit rather that what the benefit is. In OCS leasing, the fear is that private firms will be able to speculate successfully, acquiring tracts for low cash bonuses which are found to contain signficant resources. Such firms would thus reap abnormally high profits at the expense of the government and the taxpayer.

The likelihood of this outcome hinges on the "speculators'" ability to acquire a portfolio of tracts for a cash sum that turns out to be significantly less than the value of the entire portfolio once exploration has revealed which tracts, if any, have oil and gas in commercially profitable quantities. Merely acquiring a large number of tracts at a low average bonus will not prove to be a successful speculation if only a few turn out to hold recoverable resources. Even though the profits on those few tracts may be very substantial, all the other tracts in the portfolio must be written off, lowering the total value of the portfolio.

Thus whether the oil industry can profit at the taxpayers' expense by speculative acquisition of tracts under expanded lease offerings depends on whether firms can systematically acquire lease portfolios that contain yet to be discovered resources without paying so much for so many "dusters" that their total portfolio values are not increased by the discoveries made. Given the inherent uncertainty in bidders' information about tracts resources, it seems unlikely that firms will succeed in building such profitable portfolios.

ISSUE NO. 17: Commenters criticized the changing of names of some of the planning areas.

RAISED BY: NOAA, Kaktovik

RESPONSE: As noted in the DSEIS, the names of some of the planning areas have been changed to reflect the names of geologic structures within those planning areas. The maps published in the DSEIS and other recent Departmental publications clearly indicate planning area boundaries and names. Although the new names may be unfamiliar to some for a short while, there should be no lasting cause for confusion.

ISSUE NO. 18: It is recommended that the Department use net profit share leases on at least 50% of the tracts offered each year and use them on high potential tracts. The accelerated pace of leasing would reduce the return to the government even more under cash bonus bidding than under contingency bidding methods. Contingency bidding methods other than net profit share hold significant disadvantages.

RAISED BY: Alaska PIRG

RESPONSE: The selection of bidding systems to be used is not a part of the 5-Year OCS Leasing Program. See the Federal Register notice of 1/26/82, regarding bidding systems.

ISSUE NO. 19: Insufficient information and aid has been provided to aid Alaskan coast dwellers to deal with increases in population and activity. In addition, impact on inland communities has been ignored.

RAISED BY: Rural Alaska Community Action Program

RESPONSE: In the Alaska OCS, it is likely that the pace of offshore development, once a sale is held, will be relatively slow. Actual production in a particular sale area, if oil or gas are found, will likely begin several years after a sale is held, following exploration, delineation drilling, and the preparation of development and production plans. During this time local communities should have ample time to formulate and complete plans to deal with expected impacts.

NEPA documents for each proposed OCS lease sale will cover those impacts, including any socio-economic impacts, which are found to be significant. Every effort is made through consultation with State and local governments and others to identify those significant issues which should be treated in NEPA documents. The Bureau of Land Management's Alaska OCS Office administers a socioeconomic studies program which has examined a wide range of possible socioeconomic effects in may areas of Alaska. If it is found through those efforts that there are likely to be significant impacts from OCS activity on rural Alaskan communities, they will certainly be evaluated in the area-wide NEPA documents prepared for each proposed sale and mitigating measures will be developed as appropriate.

ISSUE NO. 20: The current lease market is in rough equilibrium (DOI has not proved otherwise). Therefore increased lease offerings will result in lower lease prices indicating the inefficiencies that result from (1) the reduction in projected recoverable resources due to increased uncertainty, (2) the increased costs in the offshore industries due to supply constraints, and (3) the spreading of industry's limited capital for lease acquisition over more tracts.

RAISED BY: Alaska PIRG

RESPONSE: There is probably no way to determine whether the current lease market is in "rough equilibrium." However, if it is, then expanded lease offerings will yield little increase in leasing and exploration. On the other hand, if the rate of leasing has been constraining exploration, then increased offerings will yield gains for the economy.

Certainly it is reasonable to expect that industry's current decisions on the allocation of capital to OCS investments have been matched to the opportunities being provided by the current leasing program. Such an equilibrium, however, is not very relevant to the issue of government leasing policy. The relevant equilibrium would be that achieved by a lease market in which both supply and demand were competitively determined as in private mineral rights or real estate markets. Such a market would be the best means of assuring that capital was

allocated to OCS exploration in an efficient (that is, net income maximizing) way.

It is unlikely that the rate of leasing under the current leasing program is as rapid as would be necessary to yield the level of investment in OCS exploration that would result at equilibrium under a private lease market because oil prices have increased very rapidly over the last 10 years making many previously uneconomical prospects attractive investments. The rate of leasing has not grown enough to assure the availability of all attractive prospects for investment.

While a more rapid leasing program may lower lease prices, it is not an indication that such a program is inefficient. The proper test for the efficiency of a leasing program is the relationship between the actual costs of exploration and development and the production revenues, all appropriately discounted to present value. More efficient programs have higher net present values, net being the difference between production revenues and costs. While there are other objectives to be served by a leasing program, economic efficiency is of interest because it measures the contribution which the program is expected to make to the income produced in the U.S. economy. Lower lease prices, meaning lower bonuses paid to the Federal government for individual tracts, do not indicate inefficiency in the leasing program. Lower bonuses may result from greater uncertainty about the resources of each tract, but not because such uncertainty reduces the estimates of recoverable oil and gas. Bonus reductions are more likely to arise from bidders' aversion to the risks of lease acquisition. They could also result from the fact that less intensive resource information makes it more difficult to distinguish better prospects and thus tracts appear to be more similar in value.

There is little cost to the economy from the claimed "inability to gather adequate information for bidding." Firms are now bidding on the basis of a certain amount of information. If they think the gains from collecting a little or a lot more information are greater than the costs, they will do so. If they are prevented by short run supply constraints from acquiring more information, they can postpone their bidding on additional tracts. If they decide to bid with less additional information the gravest consequence is buying the wrong tracts, which merely increases the bonus transferred to the government. Acquiring tracts does not, in itself, incur a cost that effects the income generated by the U.S. economy.

Lower lease prices may also result from expanded leasing because bidders expect input costs to be increased by the resulting increase in exploration investment. However,

this is not a sign of inefficiency so long as firms are free to make rational, profit maximizing decisions as to whether the

potential payoffs from their leasing and exploration are sufficient to make these high costs worth bearing. After all, this is exactly the way in which a market system uses prices as signals for efficient resource allocation. A leasing program that results in lower lease prices because of increased input prices would only be inefficient if somehow lesses were required to lease and explore tracts even when, at the higher costs, they would not be economically attractive. While the prices on some, perhaps even many, tracts may be lower under more rapid leasing, the test of the efficiency is the total production revenues less the costs. If more tracts are deemed attractive for investment, given the costs, and, in the aggregate, such investments pay off, then more net income will be produced. The facts that the costs were increased or that the Federal government's return on each tract was lower do not wipe out the overall economic efficiency gains from more rapid creation of net income. From the viewpoint of economic efficiency, expanded lease offerings offer a potential gain for the country. At worst, no gain would be achieved because nature has not provided the additional resources expected.

A loss could only result if substantial investments were made in exploration only to discover that the resources, in total, were systematically less than the investors expected. The only way to avoid such a loss would be to forego investment in exploration. This would be inefficient because it would sacrifice the income expected to be achieved.

ISSUE NO. 21: Commenters suggested that Secion 18(f)(1) of the OCS Lands Act, as amended, requires a Call for Nominations.

RAISED BY: North Slope Borough

RESPONSE: Section 18(f) reads in part as follows:

> (f) The Secretary shall, by regulation, establish procedures for (1) receipt and consideration of nominations for any area to be offered for lease or to be excluded from leasing;.... Such procedures shall be applicable to any significant revision or reapproval of the leasing program. 43 U.S.C. § 1334(f)(1).

This section does not require a call for nomination of tracts prior to a lease sale. It requires regulations establishing procedures for receipt and consideration of nominations of an area to the leasing program.

Section 18(f) has consistently been interpreted by the Department in this fashion. The regulations implementing this section appear at 43 CFR § 3310.1 (1980) and clearly refer to nominations of areas to be included in the leasing program. The legislative history firmly supports the Department's position. See H.R. Rep. No. 590, 95th Congress, 1st Session,

151-152 (1977); S. Rep. No. 284, 95th Congress, 1st Session. 77 (1977).

ISSUE NO. 22: California expressed concern over conduct and assessment of reoffering sales.

RESPONSE: The proposed program includes only one reoffering sale, RS-2, in June of 1982. The rationale for deleting reoffering sales can be found under III.A.1.a.1). The proposal to include RS-2 in the schedule is based on considerations of economy of administrative efforts to produce additional leasing, exploration and development results. A NEPA document will be prepared to update and supplement the previous environmental impact statements done for each component sale that can be included in the reoffering sale. In the case of RS-2, this means that those tracts that were not leased in sales 53, 56, 60 and 59 held in 1981 may be reoffered in 1982. Using the NEPA document, a decision package will be prepared that analyzes all relevant decision options.

ISSUE NO. 23: A cooperative USGS-State regulatory program was proposed.

RAISED BY: California

RESPONSE: The Department cooperates closely with the appropriate agencies of affected State governments regarding many OCS decisions, and decisions on exploration plans, development production plans, and pipeline permits. However, delegation of enforcement authority and further sharing of proprietary data would be dependent on major revisions of the OCS Lands Act, as amended, and existing regulations, which are beyond the scope of this proposal.

ISSUE NO. 24: One reviewer believes that risks are skewed to Alaska and California in violation of the Section 18 requirement that risks be shared.

RAISED BY: Center for Environmental Education

RESPONSE: We believe that the proposed program is based on, among other factors, consideration of an equitable sharing of developmental benefits and environmental risks among the various OCS regions. As a result of comments received on the proposed program, analysis of the Section 18 factors is being reviewed further. The results of this further review will be available to the Secretary before he makes a decision on a proposed final program.

It is important to note that, while the proposal calls for more sales off Alaska than off any other State, the Alaska OCS represents 60% of the total U.S. OCS. In terms of estimates of undiscovered recoverable resources, the Alaska OCS represents 44% of the total offshore mean estimate (includes quantities

considered recoverable only if technology permits their exploitation beneath arctic pack ice).

ISSUE NO. 25: Support for simultaneous PNS/FEIS and DOE/Governors review, as well as single resource estimates and elimination of government evaluation of fair market value was expressed.

RAISED BY: New Jersey

RESPONSE: We agree that the streamlined procedures cited in this comment serve to reduce unnecessary procedural delays.

ISSUE NO. 26: Concern was expressed that rapid re-entry into an area would not allow adequate time to learn from the first sale.

RAISED BY: South Carolina, California, North Slope Borough

RESPONSE: In the past, 3 years between first and second offerings were considered necessary to increase knowledge about operating conditions in an area and understanding of the geology of the area. However, for large areas where the first offering does not result in leases on all the important structures, geologic information gained from drilling in the area leased may shed little light on the geology of the remaining areas available for subsequent offering; acquiring drill hole information on the remaining, unleased structures is what is really critical. Thus, a timing convention based on acquisition of geologic data from earlier sales is of questionable value. Availability of environmental data, although considered, was not a controlling factor in scheduling second sales, since we would be able to build upon what was available for the first sale. Also, environmental studies continue after a sale and are useful in analyzing subsequent offerings.

Comments on the draft proposed schedule indicated that repeat sales in Alaska OCS areas should be scheduled at intervals that allow one field season for site surveys and one for drilling of acreage leased at the prior offering. By timing sales off Alaska to take into account the field season for the particular area -- primarily winter operations in the Diapir Field and summer operations in the Bering Sea -- the proposed schedule allows for two field seasons within the 2-year interval between sales.

ISSUE NO. 27: One reviewer commented that consideration should be given to a 10-year rather than a 5-year sale [apparently lease term].

RAISED BY: Audubon

RESPONSE: The OCSLAA provides for lease terms of up to 10 years where the Secretary finds that this time is necessary to encourage exploration of areas of unusually deep water or unusually adverse conditions. This is a sale-specific, not a programmatic decision.

ISSUE NO. 28: One commenter suggested that the proposed schedule violates the Secretary's trust responsibilities.

RAISED BY: Kaktovik

RESPONSE: This issue was recently decided in litigation in the U.S. Court of Appeals for the District of Columbia Circuit. The court ruled that no trust responsibility for Alaska Natives is violated by the schedule because such a responsibility can only arise from a statute, treaty or executive order and that no such provision can be found in any of the statutes involving the 5-year program. North Slope Borough et. al. v. Watt et. al., No. 80 1991 (D.C. Cir. October 6, 1981). See also, North Slope Borough v. Andrus, 642 F. 2d 589 (D.C. Cir. 1980).

ISSUE NO. 29: Additional study needs were cited, including: pack ice, current habitat use, pollutant transport, and biological impact potential for resources in Hope Basin, Barrow Arch and Norton Sound; oil pollution and noise effects on Alaskan marine mammals, fish and crustaceans, generic and impact studies, and sale-specific information for sales #73, #80 and #78.

RAISED BY: California, South Carolina, Manueluk Association, Alaska Rural CAP

RESPONSE: Chapter I.8 "Availability of Information" has been updated to illustrate the types of studies presently being undertaken and the types of information being obtained.

ISSUE NO. 30: The following delay or deletion recommendations were made:

a) Specific Alaska sales should be delayed pending development of local coastal zone programs.

RAISED BY: Alaska

RESPONSE: Delay of certain Alaska sales is analyzed in the January 1980 EIS and this SEIS. The Department's willingness to consider proceeding with planning activities in these areas is based on the lead times available to us for study and consultation before leasing, exploration, and later development and production are allowed to proceed. The long lead times anticipated for the start of production should allow for completion of coastal zone management plans prior to approving development and production plans as well as exploration plans in most areas. If local coastal zone management plans are not in place, we will make every effort to see that offshore and onshore development activities are properly planned and sensitive to local problems.

b) Several commenters suggested delaying sales involving deepwater or sea ice conditions where technology or mitigating measures are not currently available.

RAISED BY: New Hampshire, South Carolina, Alaska, Wildlife Federation, NOAA, Alaska PIRG, United Fishermen of Alaska, Kaktovik

RESPONSE: The availability of technology to operate in deepwater or sea ice conditions, as well as the adequacy of environmental safeguards to deal with potential problems will be evaluated as part of pre-sale planning. In general, however, we concur with the views of the Department of Energy (expressed in a February 2, 1981, letter) that "investment in new technology is dependent on acreage becoming available ...[one] can also safely assume that industry will not spend the money to acquire leases and to explore without some clear knowledge of the technology to be employed..." In addition, our willingness to proceed with planning activities in these areas is based on the lead time available before leasing, exploration, and later development and production are allowed to proceed. Technology needed for exploration in deep water and sea ice conditions is already available. We believe that sufficient lead time will be available for development of technology needed for production in these areas, if commercial deposits are found.

Finally, the Department of the Interior is working on developing mechanisms to assure that no development would take place in these areas without adequate technology. Several tracts in areas believed to be under stress by pack ice were bid on at the December 1979 Beaufort Sea sale. Operations on these tracts should provide useful insight on pact ice technology. The Department of the Interior adopted a cautious approach to operations on these tracts by advising lessees in the final Notice of Sale that drilling from platforms or structures located beyond the Barrier Islands in water depths in excess of 13 meters will be prohibited until a test platform or structure of the same type to be drilled from has been in existence in the sale area at these depths for a period of two winter seasons. Verification of the test structures will be in accordance with the Geological Survey Platform Verification program. This approach is designed to encourage the development of arctic ice capabilities while maintaining a high standard of environmental safety.

c) Several reviewers commented that all areas of high biological sensitivity should be delayed pending studies to determine impacts and possible mitigating measures. Areas where there is insufficient information to analyze the environmental, economic and social effects of leasing or where known risks to the environment, existing economy, or marine traffic are high should be deleted from the schedule, one commenter believes.

RAISED BY: California, Monterey County, Wildlife Federation

RESPONSE: Decisions on timing of sales on the proposed schedule were

made, in part, on the basis of whether sufficient information would be available at the time of the lease sale to assure proper consideration of potential environmental, economic, and social effects of leasing. If an area is not placed on the 5-year schedule, there is little reason to invest scarce resources in studying it. The purpose of the 5-year schedule is to identify areas which should be studied for leasing over the next 5 years. Deleting an area from the schedule because of "insufficient information" now will simply perpetuate that lack of information. Moreover, the Secretary is not precluded from moving forward with the leasing program due to a lack of information. See California v. Watt, No. 80-1894 (D.C. Cir. October 6, 1981), Slip. Op. at 43. Uncertainty is a risk that can be balanced with other factors. See North Slope Borough v. Andrus, 642 F. 2d 589 (D.C. Cir. 1980).

d) Tracts which could adversely affect salmon spawning grounds in Kuskokwim and Yukon Rivers should be deleted.

RAISED BY: Tanana Chiefs Conference

RESPONSE: Deletion of specific tracts from a planning area is more appropriately considered at the sale stage -- as part of the process leading to the decision on what will be included in the Final Notice of Sale.

e) Sales #86 and #100 should be deleted due to their low resource potential.

RAISED BY: NOAA

RESPONSE: One of the fundamental principles behind development of the proposal is that although we believe the OCS contains significant hydrocarbon deposits, we do not know the precise locations and quantities of these deposits. The only way to find these deposits is to open areas to exploration. Deleting areas from the 5-year schedule because of low resource estimates will only frustrate the goal of inventorying the OCS. See U.S.C. 43 § 1802(a) (Supp. II 1978).

In deciding on a final program, the Secretary will carefully balance the potential for discovery of oil and gas with the potential for environmental damage and the potential for adverse impact on the coastal zone.

f) All or portions of basins in central and northern California should be deleted because Section18 and 19 balancing precludes leasing in these areas.

RAISED BY: California, Monterey County

RESPONSE: The final program selected by the Secretary will reflect the Section 18 balancing requirements. Decisions on deletion of specific tracts on the basis of Section 19 are more

appropriately made when pre-sale planning is completed, based on information available at that time.

g) Sale #78 should be delayed until 1985 as essential geohazard, water currents and deep biota data will not be available until then.

RAISED BY: Florida

RESPONSE: Annual geohazards studies have been funded for the South Atlantic OCS since Fiscal Year 1976. No major field work is planned between now and Fiscal Year 1985. The physical oceanography program in the South Atlantic began in Fiscal Year 1976 and the BLM considers it to be one of the best coordinated of the OCS regional programs. Most information on currents is available now and a summary report will be available for the Sale 78 EIS (March 1983). We therefore do not believe that a delay in the proposed sale date is necessary.

b. Comments Regarding the DSEIS:

ISSUE NO. 1: Several commenters addressed the oilspill analysis in the DSEIS. On commenter cited spills predicted for California as if the number in the DSEIS related to the 5-year schedule, rather than to development of all estimated remaining resources. The accuracy of the spill rates was questioned. One commenter believes they do not reflect the current downward trend. Others wanted more explanation or support concerning the validity of extrapolating Gulf of Mexico statistics to frontier areas and the statement that there is no correlation between spills and environmental factors. In addition, as tankers are indicated as possible, at least for initial transportation, in most areas, it was recommended that the spill anlaysis assume tanker transport. It was suggested that a trajectory analysis should be performed, and that without predictions of what coastal ecosystems are likely to be affected, the SEIS cannot conclude that impacts would be low to moderate.

RAISED BY: California, EPA, San Mateo County, Alaska Oil and Gas Association, NRDC

RESPONSE: The platform spill rate, for spills greater than 1000 barrels, is defined as the number of spills greater than 1000 barrels which have occurred from platforms divided by the total volume of oil produced. Pipeline and tanker spill rates are similarly defined. Numbers of platform and pipeline spills and the volume of OCS oil production are provided by the USGS; these data span the years 1964-1979. The tanker spill rate is based upon the work of Stewart (1976). Tanker spill rates are particularly confined by more recent findings in Oil Spill Intelligence Report (1979, 1980). A comprehensive review of oilspill records (from all sources) is being completed under contract for BLM. There is no known evidence available which

suggests inaccuracies in the spill rates used in this document. Platform spill rates have been subjected to trend analyses. This statistically complex trend analysis has undergone peer review, and the new rates have been applied for the FSEIS. Offshore production oilspill statistics can only be acquired from producing areas; these areas in the United States are the Gulf of Mexico and California. Extrapolation of these experiences to other OCS regions is highly preferred to the alternative of using subjective opinion. The absence of significant statistical correlation between oilspills and extreme environmental factors is presented by Stewart (1977).

We have no statistical evidence to show a correlation between oilspills and geohazards. To date, there has been only one oilspill on America's OCS related to geohazards. The spill occurred on March 29, 1977 in the Gulf of Mexico; consisted of 250 bbls; and resulted from breakage of a 12 3/4 inch pipeline by a mudslide.

The volumes of oil which might be tankered initially in some locations are likely to be sufficiently small as to not warrant the assumption of using the tanker spill rates. Also, it is impossible to estimate how long tankering or barging might be necessary before sufficient pipeline capacity is developed, as it may vary substantially from area to area. It could be assumed, however, in these cases that production would not reach full capacity until pipelines are completed, and that volumes tankered initially would be statistically insignificant when compared to volumes eventually transported by pipelines.

Trajectory analysis will be carried out for each sale and presented in the sale specific NEPA documents. The specificity of information is insufficient to conduct a useful trajectory analysis for all areas of the OCS. For such analysis to be available at this time would require more detailed information concerning location of potential oil production and transportation corridors. The conclusion regarding low to moderate impacts from oilspills is judgmental.

ISSUE NO. 2: Several comments were received concerning assumptions and estimates of activity and facility development. Some felt that there were inadequate information and predictions concerning the level of activity and how these were estimated. One disagreed that the level of activities (and therefore impacts) would increase in proportion to acreage leased. The validity of extrapolating from the Gulf of Mexico data the level of discharges anticipated in other regions was questioned. One commenter indicated that the number (and impacts) of facilities which might affect the Northwest needs to be addressed. Given the lack of prediction of activities, the assumption of orderly development was questioned.

RAISED BY: California, Washington, EPA, Alaska Oil and Gas Association, Audubon, Alaska

RESPONSE: The development assumptions have been revised for the FSEIS. Rather than assuming that all resources in a planning area will be developed, projections have been made regarding the percentage of resources likely to be leased and developed from sales on the schedule (see Chapter III.A.1.a). The impact discussions have been revised accordingly. Development of the total resources in a planning area is treated in the cumulative case.

ISSUE NO. 3: Comments were received stating that the DSEIS inadequately addressed the purpose of and environmental and economic impacts of streamlined procedures, and area-wide offerings and resulting increases in acreage offered. Some commenters wanted to see an assessment of these features of the OCS program in combination with decreased funding for coastal zone management and environmental studies. Several commenters were particularly concerned about the availability of information and wanted a better explanation of how and what environmental information would be available under the new procedures, including how uncertainties and identified adverse effects would be addressed. It was also recommended that alternatives to streamlining and area-wide offerings be analyzed -- including some specific proposals.

RAISED BY: Friends of the Earth, Center for Environmental Education, New York, NRDC, California, Maine, Whale Center, North Carolina, San Mateo County, EPA, NOAA, Corps of Engineers, Alaska, North Slope Borough, Alaska PIRG, Unalakleet.

RESPONSE: The DSEIS has been revised. The FSEIS now contains detailed discussions of the streamlined leasing procedures and area-wide offerings. These discussions indicate the kinds of environmental and resource information that will be available for analysis at various points in the leasing process. The alternatives section has been revised to include evaluations of alternatives to streamlined procedures and area-wide offerings. (See Chapters II, III, and V of the FSEIS.)

ISSUE NO. 4: Many commenters expressed the need for additional information concerning mitigating measures, especially how these will differ from current procedures.

RAISED BY: NRDC, California, Corps of Engineers, Wildlife Federation, EPA, Alaska

RESPONSE: See the response to Issues Regarding the Proposal, Issue No. 2, in this chapter for an explanation as to how tract deletions and special stipulations can be used under proposed streamlined procedures. See also the discussions concerning DOI's air quality regulations and Operating Orders concerning best available and safest technology (BAST) in Chapter I.B.

ISSUE NO. 5: Some commenters questioned whether the SEIS (as opposed

to a new EIS) was appropriate considering the changes to the program proposed. It was also suggested that a revised draft SEIS might be required.

RAISED BY: Washington, Friends of the Earth, California

RESPONSE: The applicable CEQ regulations provide that agencies shall "prepare supplements if the agency makes substantial changes in the proposed actions that are relevant to environmental concerns." 40 C.F.R. § 1502.9(c). The proposed action clearly fits within the language of this regulation. A supplemental EIS also allows use of the analysis contained in the original EIS meeting the further goal under the CEQ regulations of reducing unnecessary paperwork. See 40 C.F.R. § 1500.4(j) and § 1502.21.

The Department feels it is not appropriate to issue a revised DSEIS. The proposed program of July 1981 falls within the range of alternatives considered in the DSEIS and is fully evaluated in the FSEIS. Comments received on the DSEIS and on the July 1981 proposed program have been given thorough consideration by the Department during preparation of this FSEIS.

ISSUE NO. 6: Commenters indicated that the DSEIS did not adequately address the balancing requirements of Section 18.

RAISED BY: Center for Environmental Education, Friends of the Earth, California, NRDC

RESPONSE: The supplemental EIS is only one document which goes into the decisionmaking on an OCS leasing program. It is the primary document for injecting environmental analyses into the decisionmaking process. However, it is not intended to include a complete analysis all of the factors enumerated in Section 18(a). These factors are fully considered in companion documents which will be considered together with the final supplemental EIS and original final EIS in making a final decision.

ISSUE NO. 7: The DSEIS was criticized for not demonstrating how changes in the program will increase production and protect the environment. Some disagreed that the program would accomplish these goals.

RAISED BY: NRDC, California, Maine

RESPONSE: The purpose of the EIS is to analyze potential environmental impacts of the proposal and alternatives to it, not to demonstrate how the program will increase production and protect the environment.

ISSUE NO. 8: Several commenters indicated their beliefs that the DSEIS

shared or increased what they believed were the inadequacies of the FEIS.

RAISED BY: Sierra Club, Friends of the Earth, California

RESPONSE: The FSEIS contains numerous revisions, many of which have been made in response to public review. These revisions serve to more fully describe the proposal and alternatives and to focus the discussions of potential impacts. Also, recent litigation regarding the FEIS, State of California v. Watt, Civil No. 80-1894 (D.C. Cir. October 6, 1981), did not indicate that the FEIS was inadequate.

ISSUE NO. 9: Analysis of alternatives was criticized for not adequately assessing comparative environmental and economic effects and for not resulting in an alternative to reduce impacts of the proposal.

RAISED BY: California

RESPONSE: The alternatives section (Chapter III) in the FSEIS has been revised to include some alternatives (for example, Alternative III-2, Current Schedule with Larger Offerings, and Alternative IV-2, Delete Arctic Planning Areas) which were raised in public review and to provide a comparative examination of the impacts of the alternatives.

ISSUE NO. 10: Some commenters felt the proposal and alternatives including the relationship of the proposal to sales through 1993, could stand alone - with less reference to the FEIS.

RAISED BY: Corps of Engineers, McCoy

RESPONSE: Chapter III, which includes a description and comparison of the alternatives has been revised and expanded and Chapter II includes a detailed description of the proposed streamlined leasing program. The DSEIS and the FSEIS are supplemental EIS's which supplement the analysis in the previous FEIS due to the substantial changes in the proposed action (see 40 U.S.C. § 1502.9(c)) but which refer to information in the FEIS which is still pertinent and valid in order to reduce unnecessary paperwork (40 C.F.R. § 1500.4(j)).

ISSUE NO. 11: Many commenters felt that the DSEIS assumptions did not adequately account for possible constraints on industry, including capital, rig, and trained and experienced manpower availability. Some felt the SEIS should address the possible effects shortages could have on environmental and human safety, as a result of inexperienced workers or mistakes made in equipment manufactures due to rushing to meet demand.

RAISED BY: Center for Environmental Education, NRDC, Maine, NOAA, Alaska, North Slope Borough, Kaktovik

RESPONSE: The proposed leasing program will not require industry to overextend itself regarding capital investments, building of rigs or platforms, or employment of inexperienced manpower. Rather, the proposed program is intended to remove unnecessary restrictions regarding the selection of acreage to be offered and to make available more prospective areas at an earlier date. It would be inappropriate to base impact analyses on the assumption that industry will conduct their operations or manufacture their equipment in a haphazard manner. It is more appropriate to base these analyses on the assumption that industry will continue to be required to conduct their operations on the OCS in strict compliance with existing laws and the regulations designed to ensure safety and environmental protection.

ISSUE NO. 12: Some commenters described the impact analysis as too general to be adequate and to allow the SEIS to serve as a decisionmaking tool.

RAISED BY: Friends of the Earth, Center for Environmental Education, California, Audubon, Alaska

RESPONSE: As stated in numerous responses to other issues, the FSEIS has been revised to describe more fully the proposed streamlined leasing program and to describe and compare the impacts of more alternatives. Development assumptions have been revised to reflect the more likely results of sales in the schedule.

ISSUE NO. 13: Comments were received indicating that the DSEIS ignored the findings of the NAS report (Safety and Offshore Oil) that environmental effects of OCS production are not known, that there are problems with regulations, and that it is not possible to conclude at present that technology will be adequate.

RAISED BY: Center for Environmental Education

RESPONES: The NAS report was commissioned by USGS to help it evaluate safety regulations and technology as required by Section 21 of the OCS Lands Act -- not to provide a definitive evaluation of scientific data on the environmental effects of offshore development. What work was done on environmental effects provided a background and framework for other aspects of the report. The report's conclusions represent the collective judgement of the committee that authorized the report. That committee was not made up of the type of scientific expertise necessary to make definitive pronouncements on environmental effects. Only 13 of the 258 pages of the report cover this subject.

More extensive treatment of environmental effects is given in three published background papers to the NAS report which review pertinent studies. (Safety in Offshore: Background

Papers of the Committee on Assessment of Safety of OCS Activities. 1) Bender, Michael E., Some Environmental Concerns in OCS Development; 2) Sanders, Howard L., Environmental Effects of Oil in the Marine Environment; 3) Weiss, Fred T., Status of Information on the Environmental Effects of OCS Petroleum Development.) One of these papers indicates that recent research substantiates the conclusion of a 1975 NAS report that effects of petroleum in the marine environment are not a cause for alarm. Another of the papers concludes that present knowledge of long-term effects is not sufficient to suggest changing OCS regulations for environmental protection. It further indicates that, while spills under certain circumstances can cause damage, most of these result from transportation. It also concludes that drilling muds and discharges should not cause significant effects beyond the immediate area of the well.

The third background paper to the NAS report has been widedly quoted. It criticizes a study of the Gulf of Mexico completed in 1974. This study was one of the first studies of its kind -- much has been learned since and many improvements made in research methods. The third background paper compares results of the early study of OCS development to those of tanker spill studies -- an erroneous comparison. Finally, this background paper discredits any efforts to study a developed OCS area in order to further our knowledge of the effects of OCS development, preferring frontier area studies. The Department of the Interior agrees that monitoring of frontier areas is needed. However, we think we should also learn what we can from developed areas, making judgments on available information while continuing to learn more about long-term development effects. We do not believe that we should withhold all preliminary judgments and conclusions about the effects of OCS development pending studies of effects completed after developing frontier areas.

In fact, the NAS report does not comdemn the safety of OCS operations and regulations. It notes that:

> -- oil discharges from pipelines have been small compared to volume handled -- there is a continuing trend of reduction in pipeline failures -- existing practices and procedures for well control, properly used, can prevent blowouts except in the most unusual circimstances -- technology for fixed leg platforms is mature and provides adequately for the safety of OCS operations -- there are adequate procedures for regulating fixed platforms -- existing USGS procedures for verifying the design of fixed structures should provide adequate assurance of the safety of subsea completions, deepwater structures and fixed arctic structures. (The sentence preceding this conclusion in the report has often been quoted out of context. It says the committee itself cannot presently conclude that such technology will be adequate. Then it goes on to say that USGS procedures

will assure such adequacy) -- the loss rate for mobile drilling units has steadily declined in all categories of operations except in transit or moving on or off location -- weather causes a problem here but blowouts are not a risk at such times -- there is an adequate regulatory basis for administering the safety of mobile installations.

The NAS report does not recommend an overhaul in the OCS regulatory program, but does make several recommendations. Many--such as its major recommendation on regulations needed to assure that offshore personnel are adequately trained--are in the process of being developed or implemented. A task force is evaluating other recommendations.

BLM's environmental studies program and NEPA procedures are designed to indentify early on, potential environmental effects which will require mitigation. However, realizing that uncertainties can never be totally eliminated at the pre-sale stage, the environmental studies program will also focus on post-sale monitoring to better support those decisions that must be made after a sale is held and tract specific plans are being formulated.

The FSEIS also contains a discussion of Geological Survey's procedures for requiring the use of best available and safest technologies (BAST) on the OCS as required by the OCSLA, as amended. These procedures, along with other authorities available to the Secretary, will ensure that operations on the OCS will proceed in a technologically and environmentally sound manner.

ISSUE NO. 14: Comments were received stating that SEIS should consider a worst case analysis by assessing impacts of a major spill in each planning area, and the cummulative effects of the worst case coming about in two or more areas. In another comment, a worst case analysis was requested in the absence of estimates of activities which would allow a thorough comparison of alternatives. One comment called for analysis of cumulative impacts on subsistence resources.

RAISED BY: Friends of the Earth, Alaska, North Slope Borough,

RESPONSE: For the FSEIS, resource estimates and development assumptions have been redefined to indicate more clearly the expected results of sales in the proposed 5-year schedule. The expected numbers of spills have been presented for each planning area, and the potential impacts of spills are discussed. Cumulative impacts of the proposal are also discussed for each planning area. Given these revisions, it is felt that further worst case analysis, which would necessarily be highly speculative in nature and thus of little value to the decisionmaker, would not contribute substantially to the impact analysis.

ISSUE NO. 15: The DSEIS was criticized for failing to address the impacts of changing planning area boundaries, especially North Aleutian Shelf, Diapir Field, St. George; Sale 100 area.

RAISED BY: NRDC, Alaska, North Pacific Rim

RESPONSE: In the FSEIS, Chapter V.I addresses the potential impacts of changed planning area boundaries.

ISSUE NO. 16 Sale and area deletion alternatives were recommended for assessment in the SEIS, including:

- 4 northern California basins and northern Santa Maria basin
- Santa Barbara Ecological Preserve and buffer zone
- Santa Monica Bay
- area seaward of San Diego (California)

RAISED BY: California

RESPONSE: The SEIS is intended to evaluate the potential impacts which may result from implementation of the proposed 5-year program and alternatives to it. The alternatives recommended for assessment in this comment, deletions within particular planning units, are more appropriately considered in sale-specific NEPA documents. Chapter II of the FSEIS describes the process in which deletions from particular planning areas will be considered.

ISSUE NO. 17: The DSEIS was criticized for not supporting adequately its conclusions regarding impact, and for some conclusions being at odds with impact analysis.

RAISED BY: San Mateo County, McCoy

RESPONSE: Numerous revisions have been made in the FSEIS. Revisions have been made in development assumptions on which impact analyses were based, and many revisions have been made in response to detailed public comment to clarify discussions.

ISSUE NO. 18: Comments requested that the SEIS address the impacts of increased risks associated with deepwater drillings.

RAISED BY: Maine

RESPONSE: Although it is likely that deepwater tracts may be leased, there is no basis to permit any quantitative assessment of any difference in risk that might be associated with deepwater activities. Departmental procedures do require, however, a thorough case-by-case review of technology and operations proposed to be used by lessees in deepwater, through the Geological Survey's Platform Verification Program and the best available and safest technologies (BAST) requirements of the OCSLA. The FSEIS does contain a detailed discussion of the state-of-the-art in deepwater technology (Appendix 5).

ISSUE NO. 19: Concern was expressed that the SEIS does not address the increased amount or impact of routine discharges. It was suggested in other comments that discussions of cumulative effects of routine operations should reflect knowledge gained through monitoring.

RAISED BY: NRDC, Corps of Engineers, North Slope Borough, New Hampshire

RESPONSE: Section V.2 of the FSEIS contains a revised discussion of the impacts of hydrocarbon and drilling fluids on the marine environment.

ISSUE NO. 20: The SEIS should compare each alternative's ability to achieve energy goals at acceptable cost.

RAISED BY: Alaska PIRG

RESPONSE: The purpose of this supplemental EIS is to assess the potential environmental impacts of the proposed program and of the alternatives, rather than to perform a cost-benefit analysis. The SEIS is only one of the documents to be used in the decision process. Other considerations necessary for a decision will be contained in companion documents. (See response to Issue No. 2.)

ISSUE NO. 21: Analysis of onshore lands available for leasing should be made to compare with risks and benefits of leasing offshore areas.

RAISED BY: Alaska PIRG

RESPONSE: The purpose of this program is to comply with requirements of the OCS Lands Act, as amended, which calls for, among other things, the establishing of policies and procedures which should result in expedited exploration and development of the OCS, and ensuring that the oil and gas resources of the OCS are assessed at the earliest practical time. The purpose of the SEIS is to examine the potential environmental impacts of this program and reasonable alternatives to the program which may accomplish the objectives defined in the OCS Lands Act. Onshore oil and gas production is also vital to the Nation's energy supply, but it should not be considered a substitute for OCS production. Both must be considered as integral parts of the Nation's energy policy.

ISSUE NO. 22: Commentors suggested that the cumulative impact analysis in the DSEIS was deficient.

RAISED BY: North Pacific Rim

RESPONSE: The FSEIS has been revised. The cumulative impact analyses are based on assumptions regarding development of the total potential resource in each planning area and other major

impact causing activities in the area. The FSEIS addresses cumulative impacts in each planning area for each alternative.

ISSUE NO. 23: The SEIS should explain how planning areas would be subdivided considering "special environmental concerns." There is no local expertise in Alaska to digest information in order to identify such areas or to assess mitigating measures. More active Federal support in the form of financial and technical assistance would be appropriate.

RAISED BY: Bristol Bay Native Association

RESPONSE: Chapter II of the FSEIS contains a detailed discussion of the proposed streamlined leasing process, including the Call for Information and Area Selection stages. All pertinent sources for information including BLM's environmental studies program, industry comments, Federal and State agency comments in addition to local government and interest groups comments will be given consideration in determining areas of environmental concern. Also, under the streamlined process, ample opportunities will remain for public review of NEPA documents and leasing proposals.

To date, the Alaska State and local governments and public have been responsive to opportunities to participate in the OCS leasing process, providing the Deparment with informative and useful comments regarding environmental and socioeconomic concerns related to both the leasing program and specific lease sales. Additional Federal financial and technical support to State and local governments is not a part of this proposal, as funding for coastal zone management programs is under the jurisdiction of the Department of Commerce. Although the amount of money and effort any State or local government wishes to spend on OCS related planning or the commenting process is essentially its own decision to make, we would expect continued useful and informative responses from these entities under the proposed streamlined program.

ISSUE NO. 24: Differences in spill figures in FEIS and DSEIS show the terrible increase in risk of the new schedule.

RAISED BY: Kaktovik

RESPONSE: The development assumptions and resulting impact discussions have been revised to indicate the percentage of the total resource estimate for each planning areas which we expect to be discovered as a result of the sales proposed in the leasing schedule. This presents a more accurate interpretation of development and impacts since it is highly unlikely that all of the oil and gas in a planning area would be leased and developed in one or two sales.

ISSUE NO. 25: It was suggested that the impact on water quality analysis was insufficient.

RAISED BY: Kaktovik

RESPONSE: The water quality impact analysis has been revised and expanded for all planning areas, including the Alaska planning areas. For each Alaskan planning area, water quality impacts have been analyzed and quantified wherever possible. See the revised discussions in Chapter V, Environmental Consequences.

ISSUE NO. 26: Commenters felt that the analysis of the effects of the proposal on air quality was inadequate and that problems with DOI's air quality regulations should be discussed. Some commenters disagreed with the assessment of air quality impacts or thought the impacts should be clarified.

Concern was expressed that increased offshore development would cause a number of local areas to exceed air quality standards.

RAISED BY: California, County of Mateo, Ventura County, Sierra Club Environmental Protection Agency

RESPONSE: Air quality is recognized as an issue of special concern in California and is discussed in detail in the 5-Year EIS (pp. 153-155, 272-279, and 325). The Department of the Interior regulations went into effect June 2, 1980, and established a regulatory scheme for the control of air emissions from the OCS. The DOI air quality regulations state that any impact deemed significant (paragraph 250.57-1(f)) shall be fully reduced or reduced through the application of Best Available Control Technology (BACT), depending on the attainment status of the area (paragraphs 250.57-1(d) and (e)). Several types of opportunities to effectuate this are available to the lessee. As the FEIS notes on page 272, "decisions concerning the potential impacts of offshore emissions on onshore air quality and necessity for control or offset of those emissions would be made as part of the approval process for exploration plans and development and production."

In response to California's comment on page 47 of the DSEIS, California's basis for the NOx emissions estimate mentioned in its comment is not included. Based on figures published in "Atmospheric Emissions from Offshore Oil and Gas Development and Production" (Environmental Protection Agency, June 1977), we conclude that they are much less than presented in the comment. Our calculations indicate a total of 0.07 ton/day NOx emissions for each well.

In response to California's comment on page 59 of the DSEIS, any increase in atmospheric ozone concentration is due to many things. The exact role of hydrocarbons (which include benzene and toluene) as precursors to ozone formation is uncertain and, therefore, the statement in the draft SEIS is a correct assessment of the current state-of-the-field.

Air quality modeling will continue to be performed for each proposed sale offshore California. As has been done for past sales, the Bureau will continue to work closely with State and regional air resources agencies in the assessment of impacts.

EPA has requested that the Supplement note that "the Director of the Bureau of Land Management must affirm that it (a proposed OCS oil and gas lease sale) conforms to an EPA approved or promulgated state implementation plan for air quality, pursuant to Section 176(c) of the Clean Air Act." It is the Department's position that OCS activities are not subject to the Clean Air Act. Volume 124 of the Congressional Record, pages 1624-1625, dated January 31, 1978, states that it is the belief of Congress that the Clean Air Act does not apply to OCS facilities. This issue was also resolved in California vs. Kleppe.

ISSUE NO. 27: Some commenters stated transportation and refining assumptions should be better explained and supported and the adequacy of existing transportation and refining capacity assessed. Inconsistencies were identified - e.g., DSEIS says pipelines in North Atlantic and Sale 42 EIS said tankers. Transportation from central and northern California is inconsistently discussed in the DSEIS. (One commenter requested that the potential oilspills from 400 miles of pipelines in the Gulf of Alaska be discussed.)

RAISED BY: San Mateo County, Florida, NRDC, Maine, Center for Environmental Education, Audubon, Alaska, Massachusetts

RESPONSE: The text of the FSEIS has been revised to clarify under what circumstances tankering might be employed offshore northern California. Regarding the North Atlantic planning area, resource estimates for Sale 42 were not large enough to assume that pipelines transport was feasible. However, given the large resource estimates for the entire planning area, pipelines would appear to be economically feasible. In general, the method of transport was considered in the calculation of expected number of spills for each planning area.

It can be assumed that existing pipelines and tanker routes will be used and expanded as necessary. However, use of existing refinery capacity or expansion of refinery capacity will be determined primarily by market demand, rather than by availability of supply from OCS production.

ISSUE NO. 28: Appendix I should indicate that enhanced OCS production would reduce further dependence on imports rather than increase domestic supplies, since it will only offset declining production.

RAISED BY: Alaska

RESPONSE: Decision materials prepared for the Secretary on the 5-year program characterize OCS production as reducing dependence on imported oil.

ISSUE NO. 29: One commenter suggested that future sales on Georges Bank are scheduled before the results of the monitoring program will be known. Also, the SEIS should discuss the sensitivity of canyon heads in the Georges Bank area.

RAISED BY: Natural Resources Council of Maine

RESPONSE: Exploratory drilling on Georges Bank began in July 1981. Prior to the inception of drilling, initial sampling for DOI's monitoring program occurred. During the first complete pre-drilling sampling cruise, sediments and benthic infauna were collected at 46 locations on and near Georges Bank. Epibenthic organisms and hydrographic data were also collected at selected locations. A complex suite of physical, chemical, and biological analyses will be performed on the samples collected in order to document the conditions found in the area prior to the initiation of oil and gas activities. Subsequent sampling cruises are scheduled, with results being reported to the MMS North Atlantic District Supervisor, the Bureau of Land Management, and the North Atlantic Biological Task Force, as they become available.

The FSEIS impact sections have been revised to include the sensitivity of canyon heads in the Georges Bank and Baltimore Canyon areas. See Chapter V, Environmental Consequences.

ISSUE NO. 30: Concern was expressed about the lack of information pertaining to proposal related impacts in non-lease areas. The two primary concerns were facilities needed to support OCS activities and commercial fishing (salmon stocks).

RAISED BY: State of Washington, Department of Ecology

RESPONSE: The FSEIS contains a discussion (Chapter V) regarding manufacturing goods in non-lease areas. This is considered in the NEPA document prepared for each proposed sale by the use of a national economic model, the Curtis Harris Model. Heretofore, new large facilities such as the platform fabrication yards with which Washington is concerned have not been addressed in sale specific EIS's. The past rate of OCS development has allowed the Bureau to continue under the assumption that platforms and rigs will continue to be manufactured by existing facilities in the United States or overseas. Under the present proposal, platforms and rigs may be required earlier than under the past schedules. Existing facilities may not be adequate to handle this demand. However, the number and location of new facilities are dictated by a number of marketing factors making it extremely difficult to accurately predict or assess the impacts of new facilities. When proposals are submitted to State and local governments for

facility permitting, the impacts can be assessed more accurately. The possible effects of OCS activities on salmon stocks which are important to commercial fisheries based in non-lease areas is also discussed in Chapter V.

ISSUE No. 31: Concern was expressed about the impacts of the proposal on the commercial fishing industry in the Pacific Northwest. Washington contended that salmon reared in the Northwest which inhabit marine waters and estuaries will be subjected to the effects of OCS development.

RAISED BY: Washington, Department of Ecology

RESPONSE: As was noted in the Sale #53 FEIS (page 4-135), the biggest concern regarding salmon is that of oil reaching the mouths of native spawning streams and affecting the ability of adult fish to find home streams. In addition, young salmon emerging from streams are vulnerable to spilled oil. Adult salmon which inhabit the open ocean are unlikely to be seriously affected by OCS development. Salmon reared in the Pacific Northwest may be affected while in California waters in the vicinity of oil and gas operations. These potential impacts are discussed in Chapter V of this FSEIS.

ISSUE NO. 32: Numerous comments were received criticizing the discussion of potential impacts to commercial fisheries in Alaska. Commenters requested that the SEIS emphasize the importance of fisheries in the St. George Basin and the North Aleutian Shelf, and suggested that the analysis of impacts to fisheries in the Navarin Basin, Hope Basin, and Cook Inlet were underestimated. It was also requested that the impact analysis should consider impacts not mitigated by the Fishermen's Compensation Fund.

RAISED BY: North Pacific Rim, United Fishermen of Alaska, State of Alaska, Bristol Bay Native Association, Unalaska

RESPONSE: Impact discussions in the FSEIS acknowledge that commercial fisheries in Alaskan waters are significant resources and identify potential impacts that may occur as a result of this proposal. These impact discussions have been revised in light of comments received (Chapter V.D. of the FSEIS). More specific impact analysis will be included in NEPA documents prepared for specific planning area offerings.

The FSEIS discusses the mitigative effects of the Fishermen's Compensation Fund, but also acknowledges that there are potential impacts which are not mitigated by the fund.

ISSUE NO. 33: Commenters noted that loss of an endangered species should be considered a long-term loss. One commenter also noted that Biological Opinions should be based on adequate information regarding endangered whales.

RAISED BY: County of San Mateo, North Slope Borough, Kaktovik

RESPONSE: Loss of an endangered species as a result of OCS leasing is not predicted. The BLM environmental studies program is focusing considerable effort on the study of endangered and non-endangered whales. This and other information is used in both formal and informal consultation with the National Marine Fisheries Service (NMFS) and Fish and Wildlife Service (FWS) regarding possible impacts to endangered species.

ISSUE NO. 34: Potential conflicts between OCS leasing and the marine sanctuary program are not detailed in the 5-Year Schedule EIS's.

RAISED BY: California Coastal Commission

RESPONSE: Marine Sanctuaries, in general, are designed to protect valuable or unique marine life such as marine mammals, seabirds, coral, etc. Potential impacts of OCS oil and gas activities on these resources which marine sanctuaries are designed to protect are treated on a resource-by-resource basis in this FSEIS. The potential impact of specific lease sales on specific marine sanctuaries can be addressed more appropriately in sale specific EIS's. Section I.A.5 has been revised to include information (geographic locations) on designated marine sanctuaries.

ISSUE NO. 35: Some commenters maintained that onshore impacts were inadequately assessed. The basis for projected locations of onshore support facilities was questioned.

RAISED BY: National Audubon Society, Unalaska

RESPONSE: The location of onshore facilities will be determined to a large extent by the location and amount of hydrocarbon resources found and by the geographic suitability of onshore sites. Even at the pre-sale NEPA documentation stage for specific sales it is impossible to predict with certainty the eventual locations of these facilities. Locations may not be known specifically until development plans are formulated several years after a sale. Local and State plans and zoning will be the final determinent of onshore facility locations. Prior to the actual discovery of oil and gas resources, the FSEIS can only identify those sites having potential for onshore facility location and indicate the type and magnitude of impacts which may occur. Sale specific and development/production plan NEPA documents will analyze more specifically potential onshore impacts with the benefit of more specific information regarding oil and gas resource potential and industry, State, and local planning interests.

ISSUE NO. 36: Numerous commenters felt that the analysis of potential socioeconomic impacts in the DSEIS was not sufficient.

RAISED BY: Alaska, Kaktovik, California, San Mateo County

RESPONSE: The socioeconomic impact section of the FSEIS has been revised. The socioeconomic impact discussion in this FSEIS, of course, supplements the analysis in the FEIS. This analysis indicates those areas where socioeconomic impacts are a matter of concern. More detailed analysis will be conducted for sale specific NEPA documents in which socioeconomic impacts is a significant issue.

ISSUE NO. 37: It was suggested that the DSEIS should examine the alternative of continuing with the existing program but increasing the amount of acreage offered in each sale.

RAISED BY: NRDC

RESPONSE: This approach has been analyzed as an alternative in the text of the FSEIS (Alternative III-2, Chapter III and Chapter V).

COMMENTS FROM FEDERAL AGENCIES

GENERAL COUNSEL OF THE
UNITED STATES DEPARTMENT OF COMMERCE
Washington, D.C. 20230

AUG 1 2 1981

Mr. Robert F. Burford
Director, Bureau of Land Management
U.S. Department of the Interior
18th and C Streets, N.W.
Washington, D.C. 20240

Dear Mr. Burford:

This is in reference to your draft supplement environmental impact statement entitled, "Proposed Five-Year OCS Oil and Gas Lease Sale Schedule." The enclosed comments from the National Oceanic and Atmospheric Administration are forwarded for your consideration.

Thank you for giving us an opportunity to provide these comments, which we hope will be of assistance to you. We would appreciate receiving four copies of the final environmental impact statement.

Sincerely,

Robert T. Miki
Director of Regulatory Policy

Enclosure Memo from: Robert W. Knecht
Acting Assistant Administrator
Office of Coastal Zone Management
National Oceanic and Atmospheric Administration

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Washington, D. C. 20230

August 6, 1981

NOAA COMMENTS ON THE DRAFT SUPPLEMENT TO THE
FINAL ENVIRONMENTAL STATEMENT FOR THE
PROPOSED 5-YEAR OCS OIL AND GAS LEASE SALE SCHEDULE

The National Oceanic and Atmospheric Administration (NOAA) has reviewed the Draft Supplement to the Final Environmental Statement for the proposed 5-year Outer Continental Shelf (OCS) oil and gas lease sale schedule, January 1982 to December 1986. Our comments on this document follow.

Timing of Administration Action

These comments supplement our May 21, 1981, response (attached) to the Federal Register notice announcing the decision to streamline and accelerate the current OCS oil and gas leasing program. While NOAA commends the decision of the Department of the Interior (DOI) to prepare a draft supplemental environmental impact statement (DSES) for the accelerated leasing program, recent decisions described in a July 15, DOI press release, supersede many of the alternatives and environmental considerations contained in that document. For example, the DSES solicits comment on separate alternatives to: a) specify planning areas in California (Alternative 4); b) subdivide the Gulf of Mexico into three separate planning units (Alternative 6); and c) drop or delay selected Alaskan sales (Alternative 5). DOI has preempted further consideration of alternatives 4 and 6 and modified the schedule of sales in Alaska to accomodate stratigraphic testing and arctic field seasons. It is unclear how comments on the now obsolete DSES will be constructive to future modifications of the leasing process. This is particularly true since the DOI press release announced that a separate public review of the most recent DOI changes to the leasing program will soon be initiated.

Environmental Analysis of Streamlined Leasing Process

Appendix I of the DSES describes the proposed OCS oil and gas leasing procedures. NOAA recommends that Appendix I be revised and expanded to provide a clear and comprehensive description of the new leasing strategy.

This is particularly important because NOAA believes the most significant aspects of the revised leasing program relate to the new procedures being proposed. The DSES does not address the numerous substantive issues that have been raised previously by NOAA, the states, and other interested parties concerning the new leasing process and the use of information from environmental studies for decisionmaking. Appendix I should describe in detail the steps in the leasing process and the use of information developed for those steps. In addition to the issues raised in our May 21 letter, the revised Appendix I should address the following concerns:

1. Deletion of tracts for the protection of living marine resources. It is not clear whether DOI plans to remove any tracts during the pre-lease sale period to protect sensitive living marine populations or habitats. Appendix I to the DSES states that tracts would be deleted only on the basis of national defense considerations. Through our discussions with DOI staff, NDAA has been informed that tract deletions made for environmental reasons in the past have been considered unjustified. However, the DOI press release of July 15 now asserts that tracts may be eliminated "...for environmental reasons and to accomodate other uses." NOAA believes that the policy on this issue should be explicit. DOI should indicate how, at a time when environmental studies will be broadened to cover large planning areas, specific tracts containing sensitive biological resources are to be identified for possible deletion from the sale. NOAA, through the National Marine Fisheries Service, will continue to assist DOI in the identification of tracts which contain valuable fishery and or marine mammal habitat prior to the conclusion of the pre-leasing process. However, DOI should express a commitment to identify such areas on a tract specific basis and describe how it will be accomplished in the context of the revised leasing strategy.

2. Elimination of tract selection. The decision to eliminate tract selection from the pre-leasing procedures is a significant modification to the OCS leasing process. Without the selection of a discrete group of tracts to be offered for lease within the planning area, oil spill risk assessments, onshore planning, and the development of lease sale stipulations will be extremely difficult to conduct, since delineation of specific tracts would occur after the preparation of the environmental statement. Our May 21 letter describes in detail the problems that elimination of tract selection poses for decisionmaking. In that letter we also proposed that DOI consider a "bid commitment" procedure which would retain the 21-month time frame to conduct individual lease sales, while substantially improving the quality of the environmental information available for OCS policy decisions.

The current description of the revised leasing process in the DSES offers little insight as to how the areas of likely petroleum development will be identified for the purposes of analysis in the areawide EIS. On page 4 of the DSES brief mention is given of a possible method to be used to define the portion of the planning areas likely to be developed. Under the new procedures, industry will be asked to identify areas of interest within the planning unit in response to the Call for Information. It is not evident why industry will feel compelled to identify the most prospective tracts when it is recognized that virtually the whole planning area will be offered for lease. The manner in which DOI plans to identify the areas of likely petroleum development within a planning unit should be clearly described in a revised Appendix I.

3. Post-Lease Sale Studies. The revised leasing program shifts the emphasis of environmental studies to the post-leasing stage. Appendix I of the DSES states that "...site-specific studies related to potential effects from development of a lease area will be carried out during the time between a sale and development -- three years or more --- and will be factored into later decisions." This change in the focus of environmental studies is a central component of the revised leasing strategy. The DSES should describe the level of effort and resources that are anticipated to be shifted to post-lease sale studies. NOAA should actively participate in the design and review of post-lease sale study efforts.

We encourage a greater research effort in the post-leasing phase than currently exists. With specific knowledge of reservoir location and size, concomitant planning for production, transportation, clean-up, and shore facilities can be conducted efficiently. This would provide the basis for evaluating socio-economic and environmental impacts. This strategy should be combined with adequate pre-lease sale environmental studies so that leasing within planning areas can be structured and timed to promote a logical and orderly sequence of development and to avoid and mitigate possible adverse environmental effects.

Timing and Location of Lease Sales

NOAA has reviewed the alternative leasing schedules presented in the DSES. As previously mentioned, consideration of some of the alternatives contained in the DSES has been preempted by the DOI announcement of July 15, which modified the schedule and some leasing procedures. NOAA agrees with the DOI decisions to subdivide the Gulf of Mexico into three planning areas, identify two distinct planning areas off California, discontinue the reoffering sale concept and eliminate the St. Matthew-Hall Lease Sale No. 93. Our primary concern with the timing and location of lease sales on the accelerated schedule is in Alaska.

Alternative 5 Preferred

The most favorable alternative for the scheduling of sales in Alaska is Alternative 5. This alternative, named "The Alaska Option" in the DSES, calls for two sales in Alaska in 19B2 (Diapir Field and Norton Basin), none in 19B3, two in 19B4 (Diapir Field and South Alaska), two in 19B5 (Diapir Field and Navarin Basin), and three in 19B6 (St. George, Norton Basin, and Hope/Barrow Arch). Initial emphasis on sales in the Beaufort Sea would allow industry to enter the most promising area first and develop their capabilities to proceed to other areas later. The North Aleutian Shelf Sale is postponed beyond 19B6. This would permit technology and experience, as well as knowledge of the environment, to advance and reduce potential adverse effects. This option would also allow more time for local community preparation for OCS leasing, especially along the Bering Sea coast.

We prefer Alternative 5 because it would allow greater time for planning to reduce adverse impacts in the frontier OCS areas of Alaska, "...while being only slightly behind..." (emphasis added) other alternatives in the "...opportunity to inventory OCS hydrocarbons (sic) resources and increase production quickly."

While Alternative 5 is the most favorable, other modifications should be considered for the Alaskan OCS. OOI should eliminate proposed sales in the Hope Basin (Sale #B6) and South Alaska (Sale #100) from the proposed leasing schedule due to their low resource potential. Although neither of these areas has high petroleum resource prospects, the presale efforts that will be required if they are kept on the proposed schedule will be similar to the level of effort required for high-potential OCS areas. Both areas could require substantial added investments of funds for environmental studies, placing an added burden at a time when these funds are dwindling and barely adequate for current lease areas. Without an increase in funding manpower or logistics capability, these sales will drain resources that should be devoted to areas most likely to experience industry activity. The ability of industry to meet the capital outlays, manpower and equipment requirements of accelerated leasing are recognized as uncertain in the OSES. For these reasons too, it would seem prudent to eliminate these two sales from the proposed schedule until industry's interests are better defined.

In arctic Alaska, NOAA also recommends that leasing in the Beaufort and Chukchi Seas be restricted to the fast ice zone until industry demonstrates a capability to operate safely in the mobile pack ice. In the arctic this could be accomplished by subdividing the region into three subareas (similar to the proposal for the Gulf of Mexico). Each subarea could be offered in a separate sale to allow leasing to proceed from logistically less difficult and better known areas to more difficult ones. This would also allow more time to complete reconnaissance surveys in the more remote areas and would enable government and industry to approach leasing in the arctic in a more focused, less frenetic manner.

St. George and North Aleutian Shelf basins also have some ice cover. Additionally, the last sentence of this paragraph should read "...when two subarctic sales are scheduled...."

Page 17, paragraph 5. Throughout the Summary of Impacts of the Proposal section, there is a failure to recognize that impacts can be reduced by better planning, more careful identification of issues, and more orderly phasing of exploration and development. For some sale areas, a delay of a year or more would allow acquisition of better environmental information that would result in improved leasing decisions and mitigating measures. Scheduling sales in sequential steps in frontier areas such as the Arctic region and the Bering Sea would allow infrastructure to evolve more naturally and it would allow industry to gain in both technology and experience. The effects of this would be a reduction in the potential for adverse impacts through better management and improved operations.

Page 1B, paragraph 3. Alternative 2 would not necessarily have an acreage restriction as stated. We know of no size restriction under the present leasing system.

Page 23, paragraph 1. This section should state that plans for accelerated development would require an increase in the number and/or size of onshore support facilities. Such facilities are frequently proposed for siting in sensitive coastal environments and can result in severe degradation of marine fishery habitats.

Page 23, paragraph 2. This paragraph states that the current OCS leasing pace "... allows the development of drilling and development technology to keep up with the pace of entry into potentially difficult or hazardous frontier areas." The DSES should describe how drilling and development technology will keep pace with the accelerated schedule.

Page 26, paragraph 2. This section of the DSES describes oil spill risks. However, neither the DSES nor the FES describes the increased risk of oil spills as a result of accelerating the leasing schedule. Rig utilization and construction is currently at an all time high. More rapid construction by shipyards already stretched to capacity could increase the probability of flaws in rigs, while more rapid drilling could also increase the frequency of operator errors. This acceleration could increase the possibility of blowouts and other mishaps. In addition, fully experienced operating crews for drilling rigs, which are already in short supply in the Gulf of Mexico, will be in even shorter supply, under accelerated OCS exploration which the DSES proposes. A substantially accelerated leasing schedule could increase the frequency of spills damaging to marine organisms and habitats.

Finally, NOAA recommends that the names for those Alaskan OCS planning areas renamed under the new leasing program be changed back to their original designation. The "Diapir Field" should be identified as the Beaufort Sea, the "Barrow Arch" changed back to the Chukchi Sea, and the "North Aleutian Shelf" should be properly identified as Bristol Bay. The new names have no factual basis. They have received criticism from both government and industry. More importantly they confuse discussion of environmental concerns. The familiar names should be retained.

Specific Comments on the OSES Text

The comprehension of the OSES could be greatly improved by careful editing. Misspelled words, omitted words or lines, and poor grammatical construction should not appear in a document submitted for public review. Specific comments on the the text follow.

Page 1, paragraph 3. This paragraph describes a review of the present leasing schedule that determined that the rate of OCS oil and gas leasing would marginally meet the goal of energy independence and fall short of the new goal of developing a resource inventory of offshore oil and gas resources. Since this review serves as the basis for the current proposed leasing schedule, the FSES should include a copy of the report and its conclusions in an appendix.

Page 5, paragraph 1. The sequence of events leading to the decision to conduct a sale is confused by the use of the word "subsequent" in the first sentence. The word should be "prior."

Page 11. The seaward boundaries of the planning units shown in the chart should be delineated, as should the eastern boundary of the Diapir Field. Consideration should also be given to adding 200- and 2,000-meter isobaths to give the reader some perspective of the disposition of the areas relative to shelf, slope, and deep waters.

Page 12, paragraph 3. Six of the seven Gulf of Mexico lease sales in the accelerated schedule have been delayed from dates listed in the present schedule. There is no mention of the rationale for this change. The continuing high reserve estimates for the Gulf make the delay questionable.

Page 12, paragraph 6. The arctic is characterized as an area where normal ocean-going vessels cannot operate year-round due to ice. Under this definition, the arctic should be extended, not just to the Norton Basin as was done, but also to the Navarin and St. Matthew-Hall basins as well.

Page 26, paragraph 2. The oil spill data on page 26 (and other scattered references throughout the OSES) extrapolates probabilities from well-known areas to frontier areas. While there is some value in using this method, the inclusion of three significant figures (such as 3.98) implies greater certainty than actually exists. The variance of the sample distribution should be reported.

Page 27, paragraphs 2 and 3. We prefer the use of "conditional" rather than "risked" resources estimates in analysis of these kinds, as they more realistically equate with the impacts to be considered should oil be discovered. "Risked" estimates are more properly used for projecting discoverable resources and future energy supply to the nation.

Page 2B, paragraph 5. We disagree with the first sentence of this paragraph which asserts that no new types of impacts will result from the adoption of the accelerated schedule. Onshore service facilities along the Gulf of Mexico are expanding rapidly under the present sale schedule. Under Alternative 1 expansion will be even more rapid. Since many of the non-wetland sites have already been developed, much of the new expansion will likely be into sensitive coastal wetlands.

Page 29, paragraph 2. The statement that "... oil spills reaching shore will seriously affect coastal ecosystems..." is too categorical. As observations of spills have shown, the effects on ecosystems are often very variable, depending on factors such as the energy regime and biotic populations affected. Thus the severity and longevity of effects on ecosystems may cover a wide spectrum ranging from negligible and short-lived to severe and prolonged.

Page 29, paragraph 5. We doubt the validity of the first two sentences. These statements should be adequately documented.

Page 30, paragraph 5. Adequate freshwater supplies can be a problem in the arctic, especially in winter when most surface water is frozen in place. Competition for water with local populations may not be a problem, depending on the facility site selected. Locally significant impacts on water quality may be a problem in parts of the Bering Sea, e.g., inner Norton Sound and the southeastern Bering Sea shelf, due to generally weak net circulation.

Page 3D-34. The fallacious assumption of uniform dilution of adverse impact in large planning areas is made repeatedly throughout the document and should be corrected. The magnitude of impacts depends on such factors as location, circulation regime, and environmental values at risk, and cannot be dismissed lightly in the OSEIS. Examples of this problem appear on:

Page 30, 4 and 5 lines from bottom;

Page 31, paragraph 2, last sentence;

Page 31, paragraph 6, sentence 1: (size of units is not the relevant criterion, it is distribution and quantity of traffic); and

Page 34, paragraph 4, second sentence (neither fishing effort nor OCS development are uniformly distributed over the 25 x 10^6 hectares).

Page 31, paragraph 7. As OCS production platforms would likely be clustered over producing structures, impacts on shipping and navigation from the platforms and activities related to production could be significant if the oil activities occurred in shipping lanes. For example, one can conceive of congestion in Unimak Pass resulting from Bering Sea production and associated vessel activities.

Page 32, paragraph 4. With respect to land use impacts, the magnitude of impact could be severe in areas having limited numbers of harbors. The Chukchi coast immediately comes to mind.

Page 39, paragraph 5. Conflicts with fishing in the St. George Basin could be significant if OCS oil activity is centered in the primary fishing areas. Conversely, one could expect minimal conflicts in Norton Sound given the primarily coastal nature of the fisheries there and the lack of intensity of those fisheries in comparison to the St. George area. Fisheries in the Hope Basin, Barrow Arch, and Diapir Field areas are insignificant in comparison to those in the southeastern Bering Sea. Fisheries in these areas are primarily coastal, freshwater activities.

Page 40, paragraph 5. *Vema hyalina* is a extant species which has been nominated for endangered species status. This paragraph should be revised to reflect these facts.

Page 41, paragraph 6. Accelerated leasing would not appear to increase impacts in Norton Basin, but rather cause them to occur sooner.

Page 45, paragraph 9. Two additional sale areas in the Diapir Field are mentioned; this appears to be inconsistent with the planning unit-wide leasing concept set forth earlier in the EIS. We assume the sentence should read "Two additional sales in the Diapir Field area...."

Page 47, paragraph 5. In addition to quantity impacts on sport fisheries and recreation, there will be quality impacts. In Alaska, much of the emphasis in sports is on the "wilderness experience." This attribute would be diminished with the increased use of areas.

Page 49, paragraph 3. Impacts on the important king crab fishery in the North Aleutian Basin are not mentioned. Also, little likelihood of onshore impacts in all but the southernmost part of the AVCP-Calista region from lease sale activities in the Navarin Basin would result if support facilities were located on St. Matthew Island or in the eastern Aleutian Islands.

Page 56, paragraph 6. Unavoidable adverse impacts to commercial fisheries would be likely in St. George Basin as well as in the North Aleutian and Kodiak Basins. The significance of these impacts can only be conjectured at present.

Page 57, paragraph 4. The significance of loss of habitat due to facility construction will depend to large degree on the sites selected and their importance to biota. The sites selected may be relatively little used by living marine resources.

Page 57, paragraph 5. This paragraph should note that coastal impacts could be minimized by maintaining the present schedule and, therefore, reducing the need for increased numbers of onshore support facilities.

Page 61, paragraph 1. Oil trapped in sediments may persist for periods exceeding weeks or months, as exemplified by the long-term studies of the *Metula* and *Amoco Cadiz* spills, where oil is still present years later in low energy environments. Adverse impacts on small communities following the exhaustion of oil fields, i.e., the "boom-bust" situation that has pervaded Alaska since territorial times, are not mentioned. What would local people employed in the oil fields do after their closure in the face of no alternative employment?

Page 63, paragraph 2. The Proposed Action will cause an "... irreversible and irretrievable commitment of biotic resources...(including) possible elimination or even reduction of a few small or isolated populations." This statement sets a very negative tone for environmental concerns. What efforts will be made to reduce these impacts? The DSES should describe the resources that will be committed to the environmental studies program and how this research will be used to reduce the anticipated impacts to biotic resources.

Page 66, paragraph 1. Dropping the North Aleutian sales and the St. Matthew sale would not eliminate leasing in the entire southeastern Bering Sea, since there would still be a St. George sale under Alternative 5.

Attachment

United States Department of the Interior

NATIONAL PARK SERVICE
WASHINGTON, D.C. 20240

IN REPLY REFER TO:
L7615(135)

AUG 7 1981

Memorandum

To: Director, Bureau of Land Management

From: Acting Director, National Park Service

Subject: Draft Supplement to the Final Environmental Statement; Proposed Five Year OCS Oil and Gas Lease Sale Schedule (DES 81/24)

In response to your memorandum, we have reviewed the subject document and have no comment. However, we look forward to reviewing the site-specific environmental documents when they are prepared for each sale. We will comment as to the impacts of oil and gas exploratory and development activities on the area's park, natural, cultural and recreation resources at that time.

Lee J. Whitesman

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02254

REPLY TO
ATTENTION OF:
NEDPL-I

28 July 1981

Director
Bureau of Land Management (542)
Department of the Interior
18th & C Streets, N.W.
Washington, D.C. 20240

Dear Sir:

We have reviewed your Draft Supplement to the Final Environmental Impact Statement for the proposed five-year OCS Oil and Gas Lease Sale scheduled (January 1982-November 1986). The regulatory responsibilities of our agency are adequately discussed on pages 18 and 26 of your Final Environmental Statement (1980) and apply to any changes in the present document. Due to the generic nature of the impact analysis in the Draft Supplement, we will reserve comment when site specific environmental impact statements are developed for tracts 52 and 82.

Thank you for the opportunity to review and comment. If you have any questions regarding this letter, you may contact Mr. David Tomey, of my staff, at (617) 894-2400, extension 234.

Sincerely,

Joseph L. Ignazio

JOSEPH L. IGNAZIO
Chief, Planning Division

DEPARTMENT OF THE ARMY
SOUTH ATLANTIC DIVISION CORPS OF ENGINEERS
510 TITLE BUILDING 30 PRYOR STREET S W
ATLANTA, GEORGIA 30303

REPLY TO ATTENTION OF: SADPD-R

24 July 1981

Director
Bureau of Land Management (542)
Department of the Interior
18th and C Streets, NW
Washington, DC 2D240

Dear Sir:

Comments on the Draft Supplement to the Final Environmental Statement, Proposed Five-Year DCS Oil and Gas Lease Sale Schedule are attached in response to your recent request for review.

We appreciate the opportunity of reviewing this document. While Corps projects in the South Atlantic Division do not generally extend into the DCS, dredge material disposals in the Gulf of Mexico and reef and fault zone relationships along the Atlantic coast are of potential long term interest. We would appreciate the addition of the five districts of SAD to your mailing list for review of future documents. The address of each is attached. Should there be any questions on the comments, please contact Dr. M. A. Cooper of this office, FTS 242-4619.

Sincerely,

Dan M. Mauldin

DAN M. MAULDIN
Chief, Planning Division

2 Incl
1. Comments
2. Addresses

SADPD-R

24 July 1981

SAD Comments on Draft Supplement to FEIS,
Proposed Five-Year DCS Oil and Gas
Lease Schedule, 1982-1986

1. It would be helpful if the alternatives were more clearly described in terms of the existing proposal. Deviations from the existing five-year schedule, number of sales, and planning units should be stated. This is confusing in the abstract and in the summary descriptions of the alternatives in the first section.

2. Alternatives 4, 5 and 6 do not appear to be true alternatives. They should be described to better differentiate their critical elements. Options in these alternatives appear to be included in Proposal 1 which includes considerable flexibility for unspecified subdivisions, sales and leasing in the various areas each year (page 12).

3. The significance of dates in the document is not clear. The five-year and six-year schedules are described, then mention is made of final sales in 1993 and construction over a 22 year span of time. All stages of this program should be described and put into perspective.

4. While there is a recognizable economy in referencing the FEIS to the greatest extent possible, this present document should contain sufficient information for an understanding of changes. Brief and concise comparative information should be included for this purpose and supportive reference to more detailed information made in the FEIS.

5. The EIS should include discussion of cumulative effects in such areas as the Central Gulf of Mexico as related to frontier areas to reflect information gained through monitoring, spill incidents, etc. Mitigation of adverse impacts should also be discussed in terms of what is presently being done and future options. While these rightfully should be included in the separate EISs to accompany development, there should be some indication of comprehensive planning for evaluation of the total program and predictions made at this stage. Monitoring efforts should also be addressed.

6. The schedule in the EIS indicates a firm commitment for development with minimal time provided for potential environmental studies except in Alaska. Resolution of uncertainties and identified potential adverse effects should be addressed in terms of scheduling appropriate environmental investigations so that development will proceed "in an environmentally sound manner..." with pre-lease environmental studies (Sec. 18a, OCS Lands Act as amended).

7. This program has a potential for significantly affecting threatened and endangered species, such as the manatee, whale and turtle species, under investigation in connection with reef projects in the Georgia bight. In addition, the Charleston, South Carolina area is on a fault zone which extends into the offshore areas.

8. Sections of the document particularly in need of improvement for purposes of clarity are the abstract and tables.

Incl. 1

DEPARTMENT OF THE ARMY
NEW ORLEANS DISTRICT, CORPS OF ENGINEERS
P. O. BOX 60267
NEW ORLEANS LOUISIANA 70160

IN REPLY REFER TO
LMNPD-RE

2D July 1981

Director
Bureau of Land Management (542)
Department of the Interior
18th & C Streets, N.W.
Washington, DC 20240

Dear Sir:

The draft supplement to the final environmental impact statement concerning the Five-Year Outer Continental Shelf Oil and Gas Schedule was forwarded from our Office of the Chief of Engineers, Washington, to this office for review and response.

The draft supplement has been reviewed relative to our functional area of responsibility and expertise and we have no comments to offer.

Sincerely,

FOR THOMAS A. SANDS
Colonel, CE
Commander and District Engineer

Copy Furnished:
Environmental Protection Agency
Room 537 West Tower
401 M Street, SW Mail Code A-104
Washington, DC 20460

DEPARTMENT OF THE ARMY
GALVESTON DISTRICT, CORPS OF ENGINEERS
P.O. BOX 1229
GALVESTON, TEXAS 77553

REPLY TO ATTENTION OF:
SWGED-E

23 JUL 1981

Director
U.S. Department of the Interior
Bureau of Land Management
Washington, D.C. 2D24D

Dear Sir:

This is in response to your undated letter providing a copy of the draft supplement to the Final Environmental Impact Statement concerning the Five-Year Outer Continental Shelf Oil and Gas Schedule, for review and comments.

We have no comments on the supplement. The opportunity to review the supplement is appreciated.

Sincerely,

JAMES M. SICLER
Colonel, Corps of Engineers
Commanding

United States Department of the Interior

GEOLOGICAL SURVEY
RESTON, VA 22092

In Reply Refer To:
EGS-Mail Stop 640

Memorandum

To: Director, Bureau of Land Management
Attention: Bill Van Horn (622)

From: Acting Assistant Director for Resource Programs

Subject: Review of draft supplement to the final environmental statement for the proposed 5-year OCS oil and gas lease sale schedule (1982 to 1986)

We have reviewed the draft supplement as requested in your memorandum.

General Comment

It should be pointed out in the document that by the time these listed sale areas are leased, industry will have obtained additional experience from drilling in recently leased frontier areas, such as the Alaskan arctic.

Specific Comments

Page i, Abstract, lines 9-11. The sentence beginning with "The remaining two alternatives . . ." needs to be clarified.

Page v, par. 2, line 6. Change 5 sales to 35 sales.

Page 8, table II-1. Sale No. 74 should be put back into the 1983 schedule for alternative 4.

Page 13, table II-2. The units given for undiscovered recoverable oil should read: 3mm bbls.

Page 15, table II-3. The columns titled "Drilling mud, Cuttings, and Formation water" need clarification. It is not clear what the figures in these columns represent. If they represent material to be disposed of, then the figures must be qualified (e.g., an exploratory well will produce very little formation water, several orders of magnitude less than that shown in the chart). The "Mode of transportation" column is of questionable meaning in this context.

Page 17, par. 6, line 1. The words "will be more severely impacted" should be changed to "may be . . ." because a potential is being discussed.

Page 25. The 5-year FES provided a description of the environment which is referred to in this supplement. However, the decision provided for Hope Basin and St. Matthew-Hall Basin needs to be expanded. Neither basin had been proposed at the time the 5-year FES was written. Additionally, virtually no description of the environment has been provided for the Shumagin area.

Page 26, table. The units should be "millions of bbls," rather than "billions of bbls." See table 1 on page 6 of appendix 3.

A brief discussion of the data base used to derive the probabilities of spills per area would be useful, particularly in view of the dearth of spill statistics in Alaskan OCS areas.

Page 29, par. 4. It should be made clear whether "11.55 spills" is the additional number or total number of spills. In general, the discussion should relate the proposed action's impacts to those previously identified.

Page 32, par. 3. It is stated that up to 51 platforms are predicted for central and northern California. On page 36 (last par.), it is stated that 37 platforms are predicted for central and northern California. The discrepancy should be resolved.

Page 35, par. 1, line 4. Oil spilled on the Blake Plateau could seriously impact fisheries, particularly the long-line fishery for billfish (swordfish) and tuna fish.

Page 37, par. 9, lines 2-4. Spilled oil grounding in Kachemak Bay (Cook Inlet) could substantially impact commercial/recreational/subsistence clam beds and local seasonal salmon runs.

Page 41, St. Matthew-Hall. This discussion needs to be expanded to specifically cover the sensitivity of the Pribilof Islands, St. Matthew Island, Hall Island, and St. Lawrence Island.

Page 43, par. 1, lines 4-5. Fin whales are probably semiresident and feeding on and near Georges Bank from May through August and, therefore, could be impacted significantly both by support vessels and any oilspills (CETAP, 1981, A characterization of marine mammals and turtles in the Mid- and North-Atlantic areas of the U.S. Outer Continental Shelf: University of Rhode Island, 1979 annual report, p. II-59, figure II-14k).

Page 44, par. 2, lines 5-7. Fin whales are probably semiresident and feeding in Mid-Atlantic shelf waters from at least April through September and, therefore, are likely to be impacted by support vessels and any oilspills (CETAP, 1981; Rowlette, R.A., 1980, Observations of marine birds and mammals in the Northern Chesapeake Bight: U.S. Fish and Wildlife Service, FWS/OBS-80/04, fig. 38).

Page 47, par. 7. After the word "impacts," add "deemed significant."

Page 53, California. The discussion of impacts on marine sanctuaries that should be covered in sale-specific EIS analysis should be expanded to cover State of California oil and gas sanctuaries on submerged lands and the State's codified response to actual or imminent drainage.

Page 59. Paragraph 3 should be rewritten to read: "Because many coastal areas of California have poor onshore air quality, air quality is a major concern for the California leasing areas. The prevailing winds can transport OCS air emissions onshore. For such areas with poor air quality, emissions from OCS-related development activities, if significant, would need to be offset or otherwise mitigated."

Page 59, par. 5. After the word "mitigated," add "if the impacts were deemed to be significant."

Appendix 1 - Consideration of Size, Timing and Location.

Page 4, par. 1. The last two sentences should be rewritten. Lessees have been required in the past and will continue to be required to conduct geohazards surveys over the site of proposed operations before approval is given to exploratory and/or development plans.

Page 4, par. 2, lines 9-13. The Bureau of Land Management has contracted many studies to assess the impact of the exploration, development, and production process upon the environment. Reasonable predictions can be made for the environmental impact of the "process."

page 5, par. 2, line 10. What "funds" are meant?

page 7, par. 2, lines 4-10. The concept of drilling COST wells is to gain insight into the general stratigraphy of a basin. Obviously, as more is learned, the basis for judgment and predictability will improve. Therefore, the acquisition of data from earlier sales is of value. The exploration and development program of the petroleum industry is founded upon careful analyses and evaluation of geologic data obtained from earlier work.

The phrase "a timing convention" should read "a timing of second offerings."

Appendix 5 - Deepwater Technology

This appendix is devoid of any discussion on arctic technology. It implies that state-of-the art technology may not be current and fails to discuss safety systems which are designed to prevent pollution events. Since this appendix is important to the intent and scope of the impact statement, we have forwarded, under separate cover, suggested update material for your consideration.

Pages 1-4, Exploratory Drilling. Specific numbers and statistics in this section are prior to 1979 and may be outdated.

Page 1, col. 2, par. 2. Delete "If retrieval of the riser is necessary, the retrieval of all drilling mud in the riser may be necessary."

Page 2, Table 1. Under "Typical Storage Capacities of Larger Units," the second and third items, which now read:

"Sack Mud and Cement
Bulk Mud and Cement"

should read:

"Bulk and Sack Mud
Bulk and Sack Cement."

Page 4, col. 1, par. 2. The statement, "floating rigs sometimes have power-assisted pipe racking while bottom-supported rigs do not," is not totally accurate since some of the new-generation bottom-founded rigs have the power-assisted piperacking capability.

Page 11, col. 2, last par. The statement, "a subsea choke was developed which puts the well control choke manifold on the first joint of riser above the BOP . . .", needs to be verified and the source of the information referenced.

for Eddie R. Wyott

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON O C 20460

10 AUG 1981

OFFICE OF
THE ADMINISTRATOR

Mr. Robert Burford
Director
Bureau of Land Management
Washington, D.C. 20240

Dear Mr. Burford:

The Environmental Protection Agency (EPA) in accordance with its responsibilities under the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act has reviewed the draft supplement to the final environmental impact statement (DSEIS) for the Proposed Five Year Outer Continental Shelf (OCS) Oil and Gas Lease Sale Schedule.

The proposed action in the DSEIS is to accelerate leasing to allow the more rapid and thorough exploration of potential oil and gas producing areas than the current lease sale schedule to meet the nation's energy production goals. In view of the fact that the DSEIS does not include Secretary Watt's July, 1981 proposed OCS Lease Sale Schedule, we have oriented our comments towards the general information needed to support the final selection of a new OCS leasing schedule and process. Our specific comments are enclosed.

The various alternatives analyzed consider increasing the proposed number of scheduled sales and streamlining procedures by offering entire planning areas instead of selecting specific tracts, shortening the time from the call for nominations to the sale, providing less-detailed pre-lease environmental information with separate production phase decisions supported by more detailed environmental information, and the earlier reentry to frontier areas and the tiering of EIS's.

The successful implementation of these features will depend on the availability of appropriate environmental information at critical decision points in the process. We believe the FSEIS should consider in greater detail the effects which the accelerated schedule and streamlining measures will have on the availability, timing and level of environmental information. It also should discuss the extent to which the tiering of environmental analyses

will reduce the need for detailed analyses at the leasing stage of the process. Clarification of these points in the final supplement is especially important to EPA because of our related OCS permitting responsibilities.

As you know, EPA and the Department of Interior (DOI) are currently negotiating a Memorandum of Understanding (MOU) that would coordinate the timing of EPA's National Pollutant Discharge Elimination System (NPDES) permitting process with DOI's leasing activities. The MOU would formalize EPA's participation in prelease planning and environmental studies to insure that we had sufficient information to determine appropriate permit conditions.

The DSEIS indicates that pre-leasing environmental studies will stress less detailed large-scale reconnaissance, and that the Environmental Studies Program will be phased to provide a level of detail appropriate to each step in the leasing process. If this program is implemented with respect to DOI needs only, it could severely restrict the opportunity for EPA to satisfy its data collection needs for NPDES permitting within the time frame needed for prompt commencement of drilling. We believe the overall leasing process can be made shorter by expanding the environmental assessment process to take into account EPA's information requirements, thus reducing duplication of efforts and expediting permitting.

Thank you for this opportunity to comment on the OCS Lease Sale Schedule. If you have any questions please feel free to contact me or William Dickerson of my staff at (202) 755-0770.

Sincerely yours,

William N. Hedeman, Jr.
Director
Office of Federal Activities

Enclosures

RECEIVED

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D C. 20555

Oirector (542)
Bureau of Land Management
Washington, OC 20240

Oear Sir:

This is in response to your request for comments on the Draft Supplement to the Final Environmental Impact Statement concerning the Five-Year Outer Continental Shelf Oil and Gas Schedule.

We have reviewed the statement and determined that the proposed action has no significant radiological health and safety impact. Since the document discusses sales in a number of planning areas, its generic nature precludes the requirement for inclusion of information concerning the U. S. Nuclear Regulatory Commission regulation of the commercial use of nuclear material in offshore waters.

Since we made no substantive comments, you need not send us the Final Supplement to the Final Environmental Statement.

Thank you for providing us with the opportunity to review this Oraft Supplement.

Sincerely,

Oaniel R. Muller, Assistant Director
for Environmental Technology
Oivision of Engineering

U.S. Department of Transportation
Office of the Secretary of Transportation

400 Seventh St S W
Washington D C 20590

JUL 2 2 1981

Mr. Vincent J. Hecker
Director
Bureau of Land Management
U.S. Department of the Interior
Washington, D.C. 20240

Dear Mr. Hecker:

Thank you for the oppoftunity to comment on the draft environmental impact statement for a proposed Outer Continental Shelf Lease Sale (No. 57) in Norton Sound, Alaska.

Regional Representatives of the Secretary coordinate departmental comments on environmental impact statements prepared by other agencies, that impact only one region and that may involve more than one DOT administration.

Accordingly, your letter has been referred to: Bill Royer, Regional Representative of the Secretary, Suite 580, 2 Embarcadero Center, San Francisco, California 94111. Mr. Royer will coordinate his reply with the regional offices of the Department, including the Coast Guard and Federal Aviation Administration.

Thank you for the opportunity to comment.

Sincerely,

Martin Convisser, Director
Office of Environment and Safety

DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

MAILING ADDRESS:
U.S. COAST GUARD (G-WS/11)
WASHINGTON, DC 20593
PHONE:
202 426-2262

1981

Mr. Donald P. Truesdell
Director (542)
Bureau of Land Management
Washington, D.C. 20240

Dear Mr. Truesdell:

This is in response to your letter of 27 July 1981 addressed to the DOT Water Resources Coordinator concerning the draft supplement to the final environmental impact statement concerning the Five-Year Outer Continental Shelf Oil and Gas Schedule.

The concerned operating administrations and staff of the Department of Transportation have reviewed the material submitted. The Coast Guard had the following comments to offer:

> The enclosure to reference (a) has been reviewed, and the following comments are provided:
>
> (1) On page 53, sentence 3 in the discussion in the paragraph entitled "Navigation Schemes" should be corrected to state that "their draft recommendations are that additional port access routes are not necessary at this time."
> (2) On page 59 and 60, the final paragraph of section (g) "Navigation and Shipping" should be corrected to read as follows:

"A certain amount of interference between offshore structures and vessel traffic will occur as a result of the proposed sales. This could lead to an increase in vessel casualties. Some offshore leasing areas overlap areas which have traditionally been used by ocean-going vessels but have not been officially established as fairways or traffic separation schemes. The U.S. Coast Guard's Port Access Route Study is intended to develop routing measures which will help reduce the risk of accidents."

We have no other comments to make nor do we have any objection to the project. The final statement, however, should address the concern of the Coast Guard.

The opportunity to review the draft supplement to the final environmental impact statement concerning the Five-Year OCS Oil and Gas Schedule is appreciated.

Sincerely,

W. E. Caldwell

W. E. CALDWELL
Rear Admiral, U. S. Coast Guard
Chief, Office of Marine
Environment and Systems

SPEED LIMIT 55
it's a law we can live with.

For this reason, we are concerned about the decreased level of pre-lease environmental analysis described and the effect this may have on the Bureau of Land Management's ability to identify sensitive ecological areas which might otherwise be eliminated from the lease sale acreage. Because of the significant increase in the number of acres offered in each sale, it would be difficult to thoroughly assess the specific environmental impact resulting from exploration in all areas. Certainly, environmental information may be sufficiently available to describe the potential impact in presently active OCS areas such as the Gulf of Mexico and, to a lesser extent, the Santa Barbara Channel. However, pertinent environmental information to determine the specific impact from exploration may not be available for some of the new "frontier" areas. The proposed procedure of conducting only large-scale environmental reconnaissance studies and preparing an EIS addressing only generic issues may not be adequate to assess the environmental impact in these new OCS areas.

(3) Page 5 of appendix 1 states that

> site specific studies related to potential effects from development of a lease area will be carried out during the time between the sale and development--three years or more--and will be factored into later decisions . . . . These studies will be used by GS in development of post-sale NEPA documents and in ongoing decision on the management of OCS operations.

This infers that these "post-sale NEPA documents" would include some of the most detailed environmental assessments prepared during OCS management. It is unclear, however, whether these documents would replace, or be similar to, the present environmental evaluations of OCS development and production plans prepared by the lease owner and submitted to the U.S. Geological Survey. In addition, the draft supplement does not describe the role of the Intergovernmental Planning Program in preparing these "post-sale NEPA documents." The final supplement should address these issues and describe the factors that would determine if a post-sale EIS is required.

FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON 20426

IN REPLY REFER TO:

Director
Bureau of Land Management (542)
U.S. Department of the Interior
18th and C Streets, N.W.
Washington, D.C. 20240

AUG 10 1981

Dear Sir:

We appreciate the opportunity to comment on the draft supplement to your final environmental impact statement concerning the proposed 5-year outer continental shelf (OCS) oil and gas lease sale scheduled from January 1982 to November 1986. The Federal Energy Regulatory Commission's (FERC's) Office of Pipeline and Producer Regulation commented previously on the draft environmental impact statement by letter dated October 24, 1979. The Office of Pipeline and Producer Regulation offers the following comments.

(1) The Commission is directing its efforts toward regulatory actions to improve natural gas supplies. The Commission staff recognizes the importance of OCS exploration and development for meeting the goal of increasing our domestic supply of energy. It is apparent that the proposed lease schedule (Alternative 1) would offer significant increased offshore acreage as a result of leasing entire planning areas in both developed and new "frontier" offshore areas. Under the best conditions, the proposed schedule would allow for a more wide ranging evaluation or inventory of OCS resources through increased exploration in these areas. However, it is not clear whether exploration could actually be achieved on this substantially increased lease acreage, considering the 5-year expiration term of the leases and the lead time required to plan and execute exploratory drilling programs.

(2) The Commission is responsible for the analysis of applications proposing the construction of specific natural gas pipelines and related facilities for use in interstate commerce. All natural gas produced from the OCS is considered to be interstate and is subject to FERC jurisdiction. Therefore, in addition to other issues, the FERC investigates the environmental effects of a proposed offshore project in deciding whether to issue a certificate of public convenience and necessity.

For this reason, we are concerned about the decreased level of pre-lease environmental analysis described and the effect this may have on the Bureau of Land Management's ability to identify sensitive ecological areas which might otherwise be eliminated from the lease sale acreage. Because of the significant increase in the number of acres offered in each sale, it would be difficult to thoroughly assess the specific environmental impact resulting from exploration in all areas. Certainly, environmental information may be sufficiently available to describe the potential impact in presently active OCS areas such as the Gulf of Mexico and, to a lesser extent, the Santa Barbara Channel. However, pertinent environmental information to determine the specific impact from exploration may not be available for some of the new "frontier" areas. The proposed procedure of conducting only large-scale environmental reconnaissance studies and preparing an EIS addressing only generic issues may not be adequate to assess the environmental impact in these new OCS areas.

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This infers that these "post-sale NEPA documents" would include some of the most detailed environmental assessments prepared during OCS management. It is unclear, however, whether these documents would replace, or be similar to, the present environmental evaluations of OCS development and production plans prepared by the lease owner and submitted to the U.S. Geological Survey. In addition, the draft supplement does not describe the role of the Intergovernmental Planning Program in preparing these "post-sale NEPA documents." The final supplement should address these issues and describe the factors that would determine if a post-sale EIS is required.

We hope these comments will be of assistance to you in the preparation of the final supplement.

Very truly yours,

Eugene Gambardella

Kenneth A. Williams, Director
Office of Pipeline and Producer Regulation

ADDRESS ONLY THE DIRECTOR
FISH AND WILDLIFE SERVICE

United States Department of the Interior

FISH AND WILDLIFE SERVICE
WASHINGTON, D.C. 20240

JUL 24 1981

Memorandum

To: Director, Bureau of Land Management (542)
acting Associate

From: Director, Fish and Wildlife Service

Subject: Comments on Draft Supplement to the Final Environmental Impact Statement - Proposed Five-Year OCS Leasing Schedule

We have reviewed the subject document and have no comments. The additions included in the supplement recognize the biological communities and potential impacts in each of the proposed sale areas.

We appreciate the opportunity to comment.

Robert F. Wallmatrom

DEPARTMENT OF THE ARMY
NORTH PACIFIC DIVISION, CORPS OF ENGINEERS
P.O. BOX 2870
PORTLAND, OREGON 97208

NPDPL-ER

24 July 1981

Mr. Donald P. Truesdell
Director (542)
Bureau of Land Management
Washington, DC 20240

Dear Mr. Truesdell:

Your undated letter to the Executive Director of Civil Works, Office of the Chief of Engineers providing the Draft Supplement to the FEIS proposed 5 year schedule for oil and gas leasing for review, has been forwarded to this office. The only area discussed in the report that is under the jurisdictional responsibility of the North Pacific Division is for that segment of the Continental Shelf offshore of Alaska. We have reviewed the report for that area and have no comments to make.

Sincerely,

ROBERT L. CROSBY
Colonel, Corps of Engineers
Deputy Commander

COMMENTS FROM STATE GOVERNMENTS

STATE OF MAINE
EXECUTIVE DEPARTMENT
STATE PLANNING OFFICE

JOSEPH E. BRENNAN
GOVERNOR

August 13, 1981

RICHARD E. BARRINGER
DIRECTOR

Robert L. Burford, Director
Bureau of Plan Management (542)
Department of the Interior
Washington, D.C. 20240

Dear Mr. Burford:

Thank you for the opportunity to review the draft supplemental environmental impact statement for the Department's proposed five year OCS leasing program. In response, we offer the following comments for your consideration.

First, our review was complicated by Secretary Watt's announcement of a new five year leasing program after the draft EIS was released and prior to the deadline for comments. The Secretary's proposal contains substantial modifications of the "preferred alternative" presented in the EIS. It is not entirely clear, therefore, what we are supposed to comment on. We are assuming, however, that the final EIS will contain revisions along the lines proposed by Secretary Watt, and feel that the states should have an opportunity to review these changes prior to the official publication of the final EIS.

Second, the EIS contains a number of serious deficiencies in its assumptions about and analysis of the environmental effects of the various alternatives presented. These shortcomings include:

1. The assumption that oil found in the North Atlantic will be transported ashore by pipeline contradicts previous BLM environmental impact statements for leasing in the North Atlantic which assumed that oil would be transported by tanker to the New Jersey-Pennsylvania refining center. Without more factual support, this assumption seems unwarranted. Rejecting this assumption means that oil would be transported by tanker and thus that the risks of an oil spill would be increased substantially.

2. The discussion of impacts in the North Atlantic omits a discussion of the sensitivity of canyons along the edge of the bank.

3. There is also no discussion of any increase in risks from ultra-deep water development of the type envisioned for the Atlantic during the period of the five year plan where drilling will take place in relatively porous carbonaceous reef structures.

184 STATE STREET, STATE HOUSE STATION 38 AUGUSTA, MAINE 04333 TEL (207) 289-3261 or 3154

4. The EIS dismisses concerns that production constraints may be imposed by a lack of drilling equipment or manpower. The discussion of possible equipment constraints consists primarily of assuming that any needed equipment will be "rushed to completion," hardly a reassuring view of the way in which the extremely complex offshore technology is to be set in place.

   The assumption that there will be no manpower constraints is not supported in the EIS and does not appear to be supported elsewhere. The recent National Academy of Sciences study of this issue emphasized the importance of trained and experienced personnel for the maintenance of safe operations in the offshore environment. There is already a shortage of skilled personnel worldwide which poses a further risk factor in the five year leasing program as proposed. It is interesting to note that a recent study[1] concluded that the impact of a lack of experienced personnel is most likely to be felt in mature producing areas such as the Gulf of Mexico since companies tend to transfer their most experienced personnel to the frontier areas. Depending upon the size and timing of lease sales in frontier areas, it is possible that manpower shortages may be severe enough to affect safety in all operating areas, but no discussion of this possibility takes place in the EIS. There is also no recognition that shortages on rigs and manpower are likely to be worldwide.

5. There is no discussion in the EIS of the increased risk to particular environmental resources from the area-wide leasing approach that the Department is proposing to adopt. The assumption in the EIS is that the risk to society of an oil spill increases as a result of the rise in activity. However, the risk from oil spills is actually a function of the probability of the event occurring plus the probability that the event occurring in a particular location will impact some sensitive resource. With areawide leasing there is a significantly increased possibility that areas which are sensitive to oil spills will be leased regardless of their sensitivity. Thus there is no assessment of the true increase in the risks to society of oil spills resulting from the five year plan.

6. Finally, there is no discussion of the effects of streamlining leasing procedures, particularly with regard to the information gathering process which lies at the heart of effective and sound government management of outer continential shelf resources. Past discussions of the environmental studies program heavily criticized the Department for failing to provide explicit links between the five year program and the environmental studies program in such a way that issues to be addressed in the environmental studies program were clearly identified at the decision stage of the five year program. The current EIS continues this failing.

   Without an understanding of the issues which must be addressed in environmental studies over the period of the five year plan, it is difficult to see how the Department can assure itself that the major issues are going

[1] (Zeitlin, L.R., Workplace Safety Problems in Offshore Drilling Operations in Frontier Areas, paper presented at a Conference on the Future of Oil and Gas from the Sea; June, 1981; University of Delaware.

to be addressed, and that there will be sufficient funding and attention given to the environmental studies program to support the five year program. This failing is, of course, substantially compounded by the vast expansion in area and contraction in time which the five year program envisions. This raises serious questions about the ability of the Department to adequately address the environmental concerns which are inevitably a major consideration of the OCS management process.

Even given these numerous and significant deficiencies in the EIS, the statement concludes that the preferred alternative (at least the alternative preferred at the time the EIS was written) is the most environmentally damaging of all the alternatives considered. Once full consideration is given to the issues outlined above, it is likely that the five year program as envisioned by the Department will be even more environmentally damaging than the EIS admits. Nevertheless, the Department is pressing forward with the accelerated program.

It is perhaps conceivable that an accelerated program might ultimately be in the best interests of the nation, but the EIS gives no hint whatsoever of how that could be. The Statement contains no indication that additional oil and gas will be made available; it does not compare the resources that would be made available on an accelerated leasing program to the resources made available in the current five year leasing program. It admits on page one that the present schedule showed significant potential for meeting the goal of energy independence by the year 2000. In short, the EIS does not present any argument or evidence that the benefits of the accelerated program outweigh even the risks described, much less the greater risks likely to be increased if this new approach is adopted.

The EIS does mention the current Department policy of offering large acreages on the OCS to "inventory" the national oil and gas reserves that may exist under the oceans. However, the concept of inventorying is seriously flawed. The U.S. offshore oil leasing and management system is not designed simply to collect information about resource availability. We make the OCS available to private developers for exploration and ultimately development and production. This system, which quite properly places the risks and rewards for OCS exploration on the private sector, requires that as a reward for finding oil and gas the oil companies be allowed to develop and produce it, assuming that they have an environmentally acceptable process. There is simply no way such a system can effectively "inventory" the quantities of oil and gas available in order to support future decisions. Decisions must be made now about how much oil and gas we need, how much the OCS can potentially produce and how much we should offer for sale to achieve that required level of production. Since the current lease program is capable, according to the Department's own admission, of achieving national energy independence goals by the year 2000, it is impossible for us to understand why the vastly increased leasing program, with its associated increased risks to environmental values, should be preferable as a policy.

I hope that these comments are useful to you. We will provide additional comments on the five year leasing program itself in response to Secretary Watt's letter to Governor Brennan of July 24th.

Thank you for the opportunity to comment.

Sincerely,

Holly Dominie

Holly Dominie
Acting Director

HD/cc/j

cc: Governor Joseph Brennan

July 6, 1981

Director
Bureau of Land Management (542)
Oepartment of the Interior
18th & C Streets N.W.
Washington, D. C. 20240

Dear Sir:

This letter transmits New Hampshire's comments on the Draft Supplement to the Final Environmental Statement for the new proposed five-year OCS oil and gas leasing program. We welcome the opportunity to comment on this important issue.

There are two major comments on the draft supplement. First, we believe that the supplement is inadequate in estimating the environmental effects of the new leasing program, and second, we believe that the creation of Atlantic sales are not justified under the OCS Lands Act amendments, and that the use of this type of sale would result in unnecessary impacts to the marine environment.

The only justification contained in the draft supplement for pursuing a program which both increases the number of leases and changes the leasing system is to provide for a more accurate inventory of oil and gas resources on the OCS and better meet the goal of energy independence. While these are certainly laudable goals, the Oepartment of the Interior admits that it has no knowledge as to how the oil industry will respond to the new leasing program and that several sales will have to be analyzed in order to determine the results. By Interior's own admission there is no evidence to indicate that the new proposed program will lead to a better inventory of the nation's OCS resources.

At the same time, the draft supplement greatly underestimates the environmental impact of the proposed program by saying that the additional impact is only one of intensity. Given the proposed changes in the leasing system, impacts may be seriously compounded as indicated by the following points:

- a large increase in the acreage leased on an annual basis will greatly increase use conflicts with commercial fishing and marine transportation.

- due to the lack of knowledge on the long-term and sublethal effects of drilling discharges, a large and rapid increase in drilling activity may result in cumulative and synergistic impacts on the marine environment beyond that expected.

- there may not be sufficiently experienced and trained oil industry drilling crews to adequately carry out the existing leasing program safely, much less the schedule contained in the new proposed program.

- the new leasing system may hasten the move of drilling activities into deeper water where safe and effective technology is much less proven.

- abandonment of the tentative tract selection process for areawide offerings will result in biologically sensitive or geologically unsuitable areas being offered for sale.

- it is uncertain whether either the coastal states and the federal government have the financial resources and trained personnel to provide adequate regulatory and management oversight to the drilling activity proposed in the five-year plan.

Taken together, the above points demonstrate the significant and far reaching changes that the new proposed five year program will have on the marine environment and the coastal states. The draft supplement must do a better job in analyzing these impacts particularly being cognizant of the leasing system difference in the proposal. The call for nomination and tract selection process offers a prime opportunity for elimination of environmentally sensitive and geological unstable areas from the leasing process. This major mitigation measure will no longer be available in the new proposed five year program.

In addition to the inadequacies of the draft supplement, we believe that the proposed Atlantic lease sales, 90 and 96, do not adequately meet the OCS Lands Act Amendments requirement to "define, as precisely as possible, the size, timing and location of leasing activity." To analyze the extent of such a large sale in an environmental impact statement and adequately integrate four and more years of drilling information into the leasing process would result in a document that is essentially meaningless in nature. For planning purposes, it is important for both the coastal states and the oil industry to be able to target research time and resources in the areas subject to drilling activity so that important environmental areas are protected. It is important that the best information and technology be used for OCS activities in the North Atlantic and the rest of the Atlantic in order to minimize environmental impact.

Finally, we have had discussions with officials in the Interior department which indicate that Interior is considering the combination of the North Atlantic and Mid-Atlantic sale regions and regional technical working groups in the near future. Such a combination is not considered in the new proposed program until the Atlantic sales in 1985 and, as previously indicated, we are opposed to the combination of lease sale areas in the Atlantic. The only way the valuable resources of the North Atlantic can be adequately protected is through regularly scheduled sales specifically aimed at the North Atlantic with adequate time between sales to evaluate drilling and research results for integration into the decision making process.

In conclusion, we believe that the draft supplement does not adequately assess the impact of the five year program. Based on this fact and the lack of knowledge as to whether the program will result in an inventory of OCS resources, we urge you to reconsider the alternatives in the draft supplement and select alternatives 2 or 3. The current leasing schedule and system, as embodied in these alternatives are well understood, accepted and provides for an efficient exploration of the OCS by industry. We cannot ask for anything better in a drilling program.

Sincerely,

Ronald Poltak
Director

RP/MC:am

The Commonwealth of Massachusetts
Executive Office of Environmental Affairs
100 Cambridge Street
Boston, Massachusetts 02202

EDWARD J KING
GOVERNOR
JOHN A BEWICK
SECRETARY

August 10, 1981

Robert Burford, Director
Bureau of Land Management
Department of the Interior
18th and C Streets, NW
Washington, D.C. 20240

Dear Mr. Burford:

Massachusetts is pleased to provide comments on the draft supplemental environmental impact statement (OSEIS) for the Department's proposed 5 Year Outer Continental Shelf Oil and Gas Leasing Program. I hope these comments will be useful to the Department in developing the EIS for the proposed 5 Year Leasing Program Secretary Watt submitted to Congress on July 24, 1981.

Since the leasing program analyzed in the DSEIS document is not the same as that proposed by Interior on July 24, 1981, Massachusetts' comments will be directed to the adequacy of the data and assumptions presented as the basis for this environmental assessment.

We are presently reviewing the leasing program Secretary Watt submitted to Congress and hope that Massachusetts' comments will be of assistance to your staff in developing the environmental impact assessment.

If your staff has any questions, please call Patricia Hughes, OCS Coordinator at (617) 727-9530. Thank you for the opportunity to comment.

Sincerely,

John A. Bewick
Secretary

JAB:PEH/msa

MASSACHUSETTS' COMMENTS ON DRAFT

SUPPLEMENTAL EIS FOR 5 YEAR LEASING PROGRAM

1. Consideration of sale location and timing

Section 18(a)(2) of the OCSLA as amended states that the location and timing of OCS activity shall be based on a consideration of eight factors. The DSEIS, and the final EIS for the March 1980 - February 1985 Five Year Plan inadequately describe two of these factors: (B) "an equitable sharing of developmental benefits and environmental risks" and (G) "the relative environmental sensitivity and marine productivity of OCS regions".

Neither document provides the information which Interior utilized in developing the program outlined in the OSEIS. In its discussion of the various alternative leasing schedules, the DSEIS indicates that Alternative I poses the greatest environmental harm. The 5 Year Leasing Program proposed on July 24, 1981 includes five sales in addition to those in Alternative I and accelerates some of the proposed sales.

In light of these two factors, Massachusetts recommends that the supplemental EIS for the July 24, 1981 5 year leasing program include:

The assessment done by Interior on the equitable sharing of developmental benefits and environmental risks.

2. Balancing development and impacts

In developing a 5 year leasing program, the Secretary is required, under Section 18(a)(3), of the OCSLA as amended, "to the maximum extent practicable" to obtain "proper balance between the potential for environmental damage, the potential for oil and gas discoveries, and the potential for adverse impact on the coastal zone".

The FEIS and OSEIS fail to provide the assessment of the factors listed above. The only reference to these is on page 62 of the DSEIS:

> "Few long-term productivity or environmental gains are expected as a result of the proposed schedule; the benefits of the leasing schedule are expected to be principally those associated with the increase in supplies of domestic oil and gas and a more complete knowledge of reserves. While no reliable data exists to indicate long-term productivity losses as a result of OCS development such losses are possible. However, to the extent that OCS development would replace impacts of oil which would otherwise be required such losses as a result of tanker-related oil spills may occur in the absence of the proposal; however, if this were the case, they would probably be confined to refinery centers in the Gulf of Mexico and the Mid-Atlantic".

The proposed program recommends streamlining of the OCS pre-lease sale process. One element of this streamlining is the elimination of the track selection process, and the development of area wide environmental impact analyses. In Massachusetts' view, these changes reduce the Secretary's ability to make balanced judgements regarding use of the Outer Continental Shelf.

Massachusetts recommends that the EIS for the proposed 5 Year Leasing Program include:

An assessment of how the Secretary has met the balancing requirement of Section 18(a)(3) of the OCSLA, as amended.

3. Assessment of Manpower and Equipment Capabilities

The oil industry has stated during the last few years that accelerated exploratory drilling activities is hindered by the unavailability of drilling rigs and trained personnel. Also, many drilling technicians working for Geological Survey worked previously on drill rigs and therefore bring to their job a much better understanding of the operation and the equipment they are responsible for inspecting.

The program proposed on July 24, 1981 recommends the offering of 42 sales ranging in size from 9 million to 120 million acres in comparison to the original 5 year schedule of 30 sales of between 3.8 million and 3.2 million acres.

The oil industry and the federal government will need to increase and improve their capabilities in order to successfully carry out the mandate of the revised 5 Year Leasing Program.

Massachusetts recommends that the EIS for the proposed 5 Year Leasing Program include:

(a) An assessment of the short and long term impact of rig unavailability and a shortage of trained personnel on the success of the program, and

(b) An assessment of the short and long term impact of the lack of experienced drilling technicians within Geological Survey on the conduct of the program.

4. Oil Transportation

The FEIS bases its assessment of impacts on the assumption that oil would be tankered to shore (p. 42), while the OSEIS assumes an oil pipeline (p. 26). The transport of oil from the North Atlantic OCS by pipeline has not, to date, been considered viable.

This change from tankers to pipeline transport is significant. Massachusetts recommends that the EIS for the proposed program include:

The assumptions used by Interior in determining that oil would would be transported by pipeline in the North Atlantic.

TO: 510

STATE OF RHODE ISLAND & PROVIDENCE PLANTATIONS
EXECUTIVE CHAMBER
PROVIDENCE

J. JOSEPH GARRAHY
GOVERNOR

August 5, 1981

Mr. Robert Burford
Director
Bureau of Land Management (542)
18th and C Streets, N.W.
Washington, DC 20240

Dear Mr. Burford:

The State of Rhode Island supports the expeditious development of our country's offshore energy resources and endorsed the ambitious new 5-year OCS leasing program proposed last April by the Department of the Interior. However, the Draft Supplement to the Final Environmental Statement on the 5-year program (hereinafter the "Draft EIS") has not adequately addressed what I consider a critical issue - the strategy of consolidating the three separate planning areas in the Atlantic into one or two large areas for the purpose of offering areawide tract selections by 1985.

The publication of the proposed 5-year program in the Federal Register on July 31, 1981 did not shed light on this subject; in fact, it confused the issue, because the map included in the notice showed the North and Mid-Atlantic regions combined into a single planning area stretching from the Canadian border to the Delmarva peninsula. Does this map supersede the map found on p. 10 of the Draft EIS - indicating, perhaps, that the consolidation of Atlantic OCS areas may occur well in advance of the initial planning stages of the first areawide sale, #90? Will such consolidation occur even before Lease Sale #76, designated in the schedule as "Mid-Atlantic," and allow the Department to include North Atlantic tracts in that sale? If so, when will the North and Mid-Atlantic Regional Technical Working Groups merge?

The above must be answered in the EIS to allow the affected states the opportunity to effectively assess additional planning burdens and other impacts from the consolidation of OCS planning areas. The Draft EIS leads one to believe that the Atlantic coastal states will not have to deal with such impacts until the planning process begins for Sale #90 - a presumption that would appear contradicted by the recent notice in the Federal Register.

GOVERNOR'S ENERGY OFFICE 80 DEAN ST PROVIDENCE, R 02903 TEL. XXXXXXX
(401) 277-3374

These comments on the Draft EIS do not alter Rhode Island's position on OCS energy development. Indeed, we still support the proposed revisions in the leasing program. I hope they have served only to emphasize my observation that questions have arisen on the conduct of the accelerated program in the North and Mid-Atlantic that should be addressed now so that further confusion may be avoided.

Sincerely,

Bruce Vild
OCS Program Manager

XC: Mr. Richard Barnett, New York OCS Office
Mr. Mark Chittum, Office of State Planning, New Hampshire
Mr. Charles Colgan, State Planning Office, Maine
Ms. Patricia Hughes, Massachusetts CZM
Mr. Dante Idnata, Governor's Policy Office
Ms. Lorraine Joubert, Dept. of Environmental Management
Ms. Kaye Rands, Statewide Planning Program
Mr. Craig Weatherby, Connecticut Office of Policy & Management
Mr. Lee Whitaker, Coastal Resources Management Council

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

Department of Administration
STATEWIDE PLANNING PROGRAM
265 Melrose Street
Providence, Rhode Island 02907

August 5, 1981

Mr. Richard Barnett
New York OCS Office
26 Federal Plaza, Suite 32-120
New York, N.Y. 10278

Dear Mr. Barnett:

This office, in the capacity of clearinghouse designated under OMB Circular A-95, Part II, has reviewed the Draft Supplement to the Final Environmental Statement for the Proposed Five-Year OCS Oil and Gas Lease Sale Schedule.

The following recommendation will be made by the Office of State Planning to the Technical Committee of the State Planning Council meeting on August 7:

> There is a strong possibility that a gas-processing plant will be built where a gas pipeline will come ashore from the Georges Bank. The CMTP study will investigate siting for such a plant. It is recommended that if such a plant is built in Rhode Island, a closed water loop in system should be installed which would preserve the present level of water, in view of the water shortage in this state.

Thank you for the opportunity to review this draft supplement.

Yours very truly,

[illegible]
A-95 Clearinghouse Coordinator

RJT/KFR/rjc

cc: Bruce Vild - Governor's Energy Office

File: EIS-81-08

To: 540

STATE OF NEW YORK
DEPARTMENT OF
ENVIRONMENTAL CONSERVATION
ALBANY, NEW YORK 12233

ROBERT F FLACKE
COMMISSIONER

AUG 11 1981

Oear Mr. Buford:

The State of New York offers the following comments on the Oraft Supplement to the Final Environmental Statement (FES) on the Proposed Five-Year OCS Oil and Gas Lease Sale Schedule.

If adopted, Secretary Watt's proposed revisions would radically transform the OCS Leasing Program. We are very concerned about the effect of these proposed revisions on the coastal states, especially in light of recent cuts in the Coastal Zone Management Program and the near elimination of the OCS State Participation Grants.

The Department of the Interior's intent to streamline the leasing program is commendable. However, we have serious reservations about the form those streamlining efforts have taken and the fact that the implications of several of the proposed increases are not adequately addressed in the Draft Supplement to the FES. Our specific concerns relate to changes in the environmental statement process, the environmental studies program and geohazard studies, and the effect of these changes when combined with large scale increases in the amount of acreage offered for sale.

The Oraft Supplement to the FES did not adequately discuss the effects of postponing substantive analysis of developmental impacts until after the lease sale. Although it is true that some detailed environmental assessment can only be carried out after a sale, failure to assess potential development as early as possible can have serious consequences.

Section 5 of the OCS Lands Act specifically grants the Secretary of the Interior authority to prohibit development of a lease. Though this control point does exist, it would be unfair to allow industry to invest time and money on dead-end exploration programs if those expenditures could have been avoided by addressing developmental impacts in the pre-lease sale EIS. In recognition of the financial hardship that the disapproval of a development plan can place on a company, Section 5(a)(2)(c) of the Outer Continental Shelf Lands Act provides for compensation to the lessee. Accordingly, the federal government would have to reimburse the lessee for the cost of the lease and all exploration expenses (plus interest) or, if less, for the fair value of the cancelled rights, taking into account both the anticipated revenues from the lease and the anticipated costs.

In either event, it would cost the government a great deal of money to deny a company the right to develop its lease. Unwillingness to incur this expense could affect the Secretary's decision to approve or disapprove a development plan on environmental grounds. Also, companies that have spent millions of dollars on exploration would, understandably, place pressure on OOI to allow development regardless of information turned up in post-lease sale environmental analyses. This raises the question of whether the leasing process will have so much momentum that it will effectively nullify the "downstream control points." The proposed changes to the leasing procedures increase the importance of these control points and it is essential that they work effectively.

The Oraft Supplement to the FES also failed to adequately discuss the effect of delaying tract specific geohazard studies until after the lease sale. Without the pre-lease surveys that allow elimination of severe geohazard tracts from a sale, there will be a greater possibility of lessees being denied permission to explore and/or develop after they have sunk considerable time and money in a lease. Also, if current pre-lease geohazard evaluations are dropped, the Secretary will lack information necessary to making a decision on whether the benefits of holding a particular sale outweigh the attendant environmental and socio-economic costs.

The OCS Lands Act Amendments (OCSLAA) require the Secretary to maintain a balance between petroleum development and other uses of our coastal resources. Analysis of the environmental and socio-economic effects of each lease sale is necessary to achieve this balance. However, if the Oepartment of Interior carries out its plans to offer 200,000,000 acres for lease each year, the analysis of environmental and socio-economic factors will be completely inadequate regardless of the procedures used and the balance demanded by the OCSLAA will not be achieved.

DOI's responsibility to carry out environmental reviews will also be further hampered by recent budget cuts in Environmental Studies Program. We are at a loss to understand why, at a time when OOI is proposing a more than 50 fold increase in the size of the lease sales, it has also substantially reduced funding for the Environmental Studies Program.

In addition, the deep funding cuts in the Coastal Zone Management Program are inconsistent with the increased work load the states will have to shoulder under the accelerated leasing program. Of particular concern to us is the near elimination of the OCS State Participation Grants. Without this funding, it will be very difficult to protect our State's interests in the leasing process.

As originally proposed by New York State, the OCS State Participation Grants were intended to run concurrently with the Five-Year Leasing Program. As long as the leasing program is in effect, it is essential that these grants be continued to provide adequate and predictable funding to the states affected by leasing and development activities.

For further information regarding our position on other aspects of the leasing program, please refer to the Governor's letter of June 24th, a copy of which is attached.

We thank you for the opportunity to comment on the leasing program and look forward to continued cooperation between the Department of the Interior and the States in implementation of the federal OCS Program.

Sincerely,

Robert F. Flacke

Attachment

Mr. Robert F. Buford, Director
Bureau of Land Management
U.S. Department of the Interior
18th & C Streets, N.W.
Washington, D.C. 20240

STATE OF NEW YORK
EXECUTIVE DEPARTMENT
EXECUTIVE CHAMBER
STATE CAPITOL
ALBANY 12224

COPY

June 24, 1981

RECEIVED
JUN 26 1981
COMMISSIONER OF ENVIRONMENTAL CONSERVATION

Dear Mr. Secretary:

The State of New York offers the following in response to your request for comments on the five year OCS leasing program.

The proposed changes in the new Five Year OCS Oil and Gas Program represent a major departure in the administration of this program. Because of the extensive nature of the proposed policy revisions, I [illegible] that the Department's Advisory Committee [illegible] significant [illegible]

We foresee major problems [illegible] of the acreage offered for lease. [illegible] area, several times [illegible] to [illegible] tary aspects alone, this is likely to [illegible] percentage of that much land. In addition, rig availability and the acute shortage of qualified geologists and petroleum engineers will effectively limit the oil and gas industry from [illegible] its exploration and development [illegible] several years to come.

A major objective of the OCS [illegible] lease coordination and [illegible] lease offerings contained in the Five Year Program seriously tax the capabilities of the states to analyze the environmental, economic, and social impacts of such lease sales, especially since [illegible] announced the elimination of the [illegible] Program. The single most important factor in avoiding [illegible] tion has been the extensive work done by the coastal states and the Department of the Interior in anticipating and mitigating concerns before these concerns become major problems.

9771

Enclosed for your perusal are further comments on the proposed changes to the leasing program.

We look forward to continued cooperation between the Department of the Interior and the states in implementation of the Federal OCS Program.

Sincerely,

/s/ Hugh L. Carey

Honorable James G. Watt
Secretary of the Interior
19th and C Streets, N. W.
Washington, D. C. 20240

Enclosure

cc: Honorable Robert Flacke, State Department of Environmental Conservation

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
TRENTON

DIVISION OF COASTAL RESOURCES

PLEASE ADDRESS REPLY TO
P. O. BOX 1889
TRENTON, N. J. 08625

July 21, 1981

Mr. Robert F. Burford
Director, Bureau of Land Management
Department of the Interior
18th and C Streets, N.W.
Washington, D.C. 20240

Dear Mr. Burford:

Attached are the New Jersey Department of Environmental Protection's comments on the Draft Supplement to the Final Environmental Statement for the Proposed Five-Year OCS Oil and Gas Lease Sale Schedule. I will be presenting these comments orally at the public hearing to be held in New York on July 21, 1981. The Department of Environmental Protection supports the comments submitted by Governor Byrne to Secretary Watt on the proposed revised OCS leasing program.

If you have any questions, please contact me or Jessica Winslow at the above address or at (609) 292-2795.

Sincerely,

David N. Kinsey
Director

DNK/JW/dy

cc: Ms. Jessica Winslow
Mr. John R. Weingart

August 6, 1981

Director (542)
Bureau of Land Management
U.S. Department of the Interior
18th and C Streets, N.W.
Washington, D.C. 2D24D

Dear Sir:

The Commonwealth of Virginia has completed its review of the Draft Supplement to the Final Environmental Impact Statement on the Proposed Five-Year DCS Dil and Gas Lease Sale Schedule. The Council on the Environment is responsible for coordinating the State's review of federal environmental documents and for responding to appropriate federal officials on behalf of the Commonwealth. The following agencies took part in this review:

Department of Conservation and Economic Development
including OCS Activities Dffice
Marine Resources Commission
State Water Control Board
Dffice of Emergency and Energy Services
Virginia Institute of Marine Science
Virginia Port Authority.

The Commonwealth of Virginia endorses Duter Continental Shelf oil development and has supported efforts to expedite offshore oil exploration and production in the past. While we have no objection to the proposed alternative, certain concerns have been raised with respect to the details of its implementation. We urge your consideration of the attached comments of state agencies in this regard. We also call your attention to earlier Commonwealth comments contained in the attached letter of May 21 to Secretary Watt on this subject.

Thank you for the opportunity to review this document.

Sincerely,

J.B. Jackson, Jr.

Enclosures

cc: The Honorable Maurice B. Rowe, Secretary of Commerce and Resources
Mr. Bruce B. Meador, Department of Conservation and Economic Development
Mr. Brian D. Harrison, State Water Control Board
Mr. Edward F. Wilson, DCS Activities Office

JBJ/CHE/all

TO: 510

North Carolina
Department of Administration
116 West Jones Street Raleigh 27611

James B. Hunt, Jr., Governor
Joseph W Grimsley, Secretary

August 7, 1981

Office of Marine Affairs
(919) 733-2290

Mr. Robert Burford
Director
Bureau of Land Management
Department of Interior
18th & C Streets, N. W.
Washington, D. C. 2D240

Dear Mr. Burford:

Enclosed you will find the comments developed by the Outer Continental Shelf Task Force on the Draft Supplement to the Final Environmental Impact Statement. Proposed Five Year DCS Dil and Gas Lease Sale Schedule, January 1982 - December - 1986.

Thank you for this opportunity to comment.

Sincerely,

Eric Vernon

Eric A. Vernon
OCS Coordinator

EV/bh

encl.

North Carolina
Department of Administration
116 West Jones Street Raleigh 27611

James B. Hunt, Jr., Governor
Joseph W. Grimsley, Secretary

August 7, 1981

Office of Marine Affairs
(919) 733-2290

MEMORANDUM

TO: Chrys Baggett
State Clearninghouse

FROM: Eric Vernon EV
OCS Coordinator

RE: Draft Supplement to Final Environmental Study, Proposed Five Year DCS Oil and Gas Lease Sale Schedule, January 198_ - December, 1986, CH 81-5236

The OCS Task Force has reviewed the Draft Supplement to the Final Environmental Study (Draft) and has received other comments from the Department of Cultural Resources, Historic Preservation Dffice and the Department of Natural Resources, Office of Coastal Management, Field Services Section.

The Draft outlines a streamlining plan which would effectively reduce unnecessary bureaucratic steps in the adopted program and deserves praise for those recommendations. However, the goal of achieving efficiency could also result in unintended negative effects.

The Task Force has identified as its primary concern, that the Draft may reduce the amount of time available to prepare environmental impact statements, that those impact statements will not be sufficiently comprehensive and that the need for review and monitoring of OCS acitivities will not keep pace with OCS exploration.

The Environmental Studies Program (ESP) is the most important part of the environmental impact statement. A streamlining proposal which prevents the use of this program in the preparation of the EIS is unacceptable. The ESP funding should be increased and accelerated. Even if the ESP schedule can not keep up with an accelerated schedule, greater emphasis on review and monitoring may cure information deficiencies and adjustments could be made in planning and permitting requirements. These concerns are not adequately addressed in the Draft.

The Draft would not only accelerate the leasing process, but would address the impacts of offshore exploration and development on geological basins. The areas would be much larger than in previous EIS for Atlantic lease sales and would further reduce the effectiveness of the process. Reducing the amount of time to analyze such information may be a greater waste of time and money than the adopted program if the effort is meaningless.

The State is also concerned that the proposed program not be adopted prematurely. Lease Sale #78 is affected only partially by the Draft, but already certain informational meetings and plans that were the rule in previous leasings have been eliminated. The State would oppose any effort by Department of Interior to conduct Lease Sale #78 as an "areawide" sale rather than a "tract selection" sale as is proposed.

North Carolina is concerned that accelerating the program in a frontier area will result in unnecessary negative onshore impacts, particularly if oil and gas production is commenced. Furthermore, the State objects to the treatment of archaeological and/or historical resources as "unknown". To the contrary, there is documentation to indicate that known archaeological and historical resources are present on the OCS.

The proposed revisions to the Five Year Oil and Gas program are not totally beneficial either from an environmental perspective or a management perspective. Careful planning on the National, Regional and State levels could promote oil and gas exploration and development, yet mitigate impacts of these activities.

Thank you for this opportunity to comment. Further questions should be addressed to Eric Vernon, OCS Coordinator, Office of Marine Affairs, (919) 733-2290.

EV/bh

State of South Carolina

Office of the Governor

RICHARD W. RILEY
GOVERNOR

POST OFFICE BOX 11450
COLUMBIA 29211

August 6, 1981

The Honorable James G. Watt
Secretary of the Interior
Interior Building, Room 6151
Washington, D. C. 20240

Dear Secretary Watt:

Thank you for the opportunity to comment, once again, on the proposed revisions to the Five-Year OCS Oil and Gas Lease Sale Schedule. The Draft Supplement to the Final Environmental Statement contains little new information. As a consequence, my comments have not changed significantly from those contained in my May, 1981, letter to you.

When contemplating changes of the magnitude described in the Draft Supplement, it seems important to place an accelerated OCS leasing program in the proper perspective. The contributions which an accelerated leasing program can make to energy self-sufficiency must be seen as only one part of our total national energy policy. The potential for obtaining increased energy supplies from this non-renewable source must be balanced against the potential for harm to our valuable renewable fishery resources, as well as to other fragile aspects of the coastal and offshore environment.

Please give the attached comments, as well as those from my fellow Governors, your careful attention.

Yours sincerely,

Dick Riley

Richard W. Riley

RWR/ges

Comments on Draft Supplement to the Final Environmental Statement

Office of the Governor
South Carolina

Schedule

As noted in my May letter, the State of South Carolina is concerned by the proximity of lease sales 56 and 78. The existing Five-Year schedule does not allow sufficient time between the two sales for information obtained as a result of the first to be used in planning for the next. The accelerated leasing schedule exacerbates this problem. If Sale 78 is held as proposed, in July of 1983, slightly less than two years will have elapsed since Sale S6. Because ten year leases have been offered as a result of Lease Sale S6, it seems likely that exploration will have progressed only slightly, if at all, by the time Sale 78 is held. Failure to delay Sale 78 until Sale S6 exploration activities are well underway would seem to deny us the opportunity to benefit from past experience.

The South Atlantic states have repeatedly expressed the concern that the Environmental Studies program is not keeping pace with the lease schedule. The proposed accelerated schedule simply widens the gap between lease sales and completion of the environmental studies necessary to prepare for them. At the ternary conference of the South Atlantic OCS environmental studies program in Raleigh, North Carolina (March 4-5,1981), the Chief of Environmental Studies, New Orleans OCS Office, indicated that the studies covering a major portion of the area to be offered in Lease Sale 78 were already a year behind schedule. If the sale is advanced, we cannot hope to obtain useful information from the studies program in time to influence pre-sale decisions.

Scheduling OCS leasing activities in such a way as to preclude the preparation of meaningful environmental impact statements may be false economy. The leasing may proceed at a more rapid pace only to be delayed indefinitely by lawsuits.

Adequate environmental information (obtained from studies as well as from past exploration experiences) is particularly crucial in a frontier area where many of the tracts are located in unusually deep water. Deep-water drilling is not yet a clearly proven technology in this country. At the same time, the underwater terrain, as well as currents and weather in some areas scheduled to be offered for lease, are highly variable. We lack the knowledge necessary to assess the impact of exploration and drilling on our valuable commercial and recreational fishing industries, and do not believe that leasing should be accelerated without some assurance that the requisite information will be obtained.

Streamlining

The preparation of basin-wide environmental impact statements, followed by supplemental environmental statements for specific sales is a useful idea and should eliminate duplication of effort. However, the basin-wide analysis should never be used as a substitute for site-specific information, but rather as a means of considering cumulative impacts of leasing.

Unfortunately, the usefulness of the supplemental environmental impact statements depends upon advance tract selection. Without advance knowledge of the tracts offered for lease, the specific information necessary to make informed decisions cannot be generated.

States cannot plan for the potential impacts of exploration and development in the absence of advance tract selection. Without some foreknowledge of the tracts to be offered for lease, states have no basis for evaluating on-shore impacts. The Regional Technical Working Groups, charged with developing regional transportation management plans, will have no basis on which to proceed until after a sale is held. At this point, the transportation management plans will have to be prepared hurriedly and will lose a great deal of their value to state and industry officials alike.

Advance tract identification is also necessary in order to allow the Department of Interior to make an adequate assessment of the consistency, or lack thereof, of a proposed sale with state coastal zone management plans. Obviously, it is also necessary for states to have this information in order to respond to consistency determinations.

The OCS Lands Act Amendments of 1978 require the Secretary of Interior to develop a program "indicating, as precisely as possible, the size, timing, and location of leasing activities". The proposed leasing program does indicate the maximum size of leasing activities (e.g. "Atlantic"). It also indicates the timing of the lease sales. However, the location of leasing activities provided by the proposed lease schedule cannot in any way be construed as "precise". Appendix 1 of the Draft Supplement is presumably an attempt to explain how the proposed lease schecule and streamlining proposals meet the intent of Section 18(a) of the OCSLAA. We find the paragraph entitled "Location" to be inadequate for this purpose.

As noted in earlier correspondence, the ability of the Department of Interior and the U. S. Geological Survey to carry out their responsibilities under this the accelerated program is questionable at best. Observation of, as well as discussions with, regional BLM staff members indicates that they are operating at full capacity now. Adoption of the proposed lease schedule will necessitate additional staff members for both the Bureau of Land Management and the U. S. Geological Survey.

Finally, we question the ability of the oil and gas industry to explore leases as quickly as the Department intends to offer them. Recent discussions with representatives of the American Petroleum Institute, Exxon and Texaco have indicated that personnel, as well as monetary resources, are limited. In addition, availability of the necessary equipment may be a problem. Under these circumstances, accelerated leasing will serve neither the industry nor the U. S. Treasury well.

In summary, the State of South Carolina would like you to consider the following points:

1. Sale 78 (South Atlantic) was scheduled too early for adequate environmental information to be available under the previously approved schedule. Even less environmental information will be available under the proposed schedule.

2. The lease schedule should not be accelerated without a concomitant acceleration of and increased funding for the environmental studies program.

3. Specific tract identification is necessary before the lease sale is held, in order to facilitate consistency determinations, state planning decisions, and supplemental environmental impact statement preparation, and to meet the requirements of Section 18(a) of the OCS Lands Act Amendments.

Thank you for the opportunity to comment on the Draft Supplement to the Final Environmental Statement.

GA .81-06-26-005
July 27, 1981
Page 2

The following State agencies have heen offered the opportunity to review and comment on this project:

Natural Resources
Office of Planning & Budget

cc: Rick Cothran, P&HS

CHB:dr

Office of Planning and Budget
Executive Department

Clark T. Stevens
Director

GEORGIA STATE CLEARINGHOUSE MEMORANDUM

TO: Director
Bureau of Land Management (542)
Department of Interior
18th & C Streets, N.W.
Washington, O.C. 2024

FROM: Charles H. Badger, Administrator
Georgia State Clearinghouse
Office of Planning and Budget

DATE: July 27, 1981

SUBJECT: RESULTS OF STATE-LEVEL REVIEW

Applicant: OOI/BLM

Project: Draft Supplement to the Final Environmental Statement; Proposed Five-Year OCS Oil and Gas Lease Schedule

State Application Identifier: GA 81-06-26-005

The State-level review of the above-referenced document has been completed. As a result of the environmental review process, the activity this document was prepared for is recommended for further development with the following recommendations for strengthening the project:

COMMENTS

The Department of Natural Resources has reviewed the United States Department of the Interior's Draft Supplement to Final Environmental Statement: Proposed Five-Year OCS Oil and Gas Lease Sale Schedule, prepared by the Bureau of Land Management. It is our understanding that the Bureau of Land Management has been contracted for a predictive model study for underwater archaeological sites for the purpose of offshore drilling leases. In order to evaluate alternatives, projects, etc., pertaining to offshore drilling, we will need to see that study. For additional imformation in this matter please contact Rick Cothran at (404) 656-2759.

STATE OF FLORIDA
Office of the Governor
THE CAPITOL
TALLAHASSEE 32301

BOB GRAHAM
GOVERNOR

August 7, 1981

Robert F. Burford, Director
Bureau of Land Management (542)
Department of the Interior
18th and C Streets, N.W.
Washington, D.C. 20240

Dear Mr. Burford:

This office has reviewed and coordinated a review of the document entitled "Draft Supplement to the Final Environmental Statement, Proposed Five-Year OCS Oil and Gas Lease Sale Schedule January 1982 - December 1986." Florida recognizes the need to reduce dependence on foreign oil sources and continues to support OCS development as long as adequate protection and consideration is given to our unique sensitive environment. As stated in Governor Graham's May 18, 1981 letter to Secretary Watt, Florida has no objections to streamlining the pre-lease sale process and supports the OCS Advisory Board's subcommittee report on implementation of the 5-year leasing program. However, we do have several concerns regarding the proposed program submitted by Secretary Watt. These are given below for your consideration.

Environmental Studies

Florida has continuously expressed its concern that proper environmental and socioeconomic studies be conducted in a timely fashion to insure data will be available for sound management decisions and proper cost/risk analysis. We will continue to support detailed environmental studies for future sales, as these are a basis for sound decision making. There is a serious lack of baseline environmental information in the waters south of 26° north latitude. particularly offshore Florida Bay and Florida Keys. We are not at this time convinced that the information we will need to determine which areas are particularly sensitive ecologically will be provided by the phased Environmental Studies Program described in Appendix 1. Florida probably will be required to request deletion of tracts in planning areas in which suitable studies have not been conducted, to ensure that these resource-rich areas are not damaged.

State Response Time

Florida is concerned that by increasing the amount of acreage offered, streamlining the leasing process, and tiering of NEPA documents, affected states will have less time to assess the environmental effect of each sale. In addition, the recent rule interpretation of the term "directly affecting the coastal zone" as found in Section 307(c)(1) of the Coastal Zone Management Act of 1972, as amended, greatly diminishes the type and timing of OCS activities that the state will have the authority to influence. This increased

activity and responsibility comes at a time in which the federal government has proposed a total elimination of federal funds to assist states in mitigating and planning for impacts of OCS development.

Gulf of Mexico Planning Area

Oil and gas activity in the eastern Gulf of Mexico off Florida's coast has been fairly limited to date as compared with the western and central Gulf areas. The types of impacts expected in our frontier area as a result of future lease sales will be greatly different from those expected in the developed central and western Gulf. Due to the frontier nature of the eastern Gulf of Mexico, the reduced impact assessment period, and the increased acreage offered per sale, Alternative 6, which establishes three sub-regions in the Gulf of Mexico, appears to offer the potential for the comprehensive, region specific impact analysis necessary to assure that Florida will not be required to endure the economic, social, and environmental penalties of accelerated energy development in the eastern Gulf of Mexico.

Environmental Impact Statements

The environmental impact statement (EIS) for a specific region should address cumulative and sale-specific offshore and onshore impacts. All EISs should also address those activities which occur in one region but may affect an adjacent region. An oil spill in the central Gulf of Mexico may affect the eastern Gulf. Discussion of offshore activity in the southeast Gulf off the southwest coast of Florida should address impacts in the Florida Straits and other Gulf Stream related areas. The interdependence of the Gulf of Mexico and the South Atlantic at the tip of Florida must be recognized when assessing offshore and onshore impacts.

We also have concerns that the lease sale EISs will concentrate only on the exploration phase and its impacts, while development impacts will be presented later as necessary. While this approach is not entirely unrealistic, it presents several problems:

1. While current EISs could easily include more information regarding potential OCS activities, an EIS that addresses only part of the total OCS process will definitely be of less benefit to local and state decision makers.

2. The potential for major impacts from development and production will be hidden from the reviewer.

3. Once it is determined that development and production may occur, is there any guarantee that site-specific studies related to those activities will address their impacts adequately? And will there be sufficient time to properly assess and evaluate impacts?

Fair Market Value

Florida is concerned that tracts leased under the proposed system be leased at fair market value. It is our understanding that, at the present time, the USGS can barely keep up with assessment of potential oil and gas reserves in the current acreage presently being offered. If this is the case and no such determination is made before sale, how will citizens be assured that a fair price is being offered? In addition, industry's capability to take advantage of more acreage being offered remains a question. The assumption that oil and gas resources will be discovered more rapidly by increasing acreage seems ludicrous if the oil industry is not encouraged to explore more rapidly or does not have the capability of doing so.

The Lease Sale Schedule

For the most part, we have no objection to the proposed 5-year OCS oil and gas lease sale schedule. We continue to recommend that sale 78, scheduled for July 1983 in the South Atlantic, be postponed until 1985. This request was presented to Secretary Watt by Governor Graham in his May 18th letter. Florida does not object to the acceleration of the Gulf of Mexico lease sales provided that the accelerated schedule and resulting increased rate of OCS activities does not jeopardize:

1. the timely provision of information - of fully sufficient detail and comprehensiveness - concerning the environmental, socioeconomic, and cultural impact of planned OCS activities;

2. the adequacy of the time allowed for public review of and comment concerning this information;

3. the legitimate right of the states to receive the fullest consideration of their recommendation that certain tracts be ommitted from planned lease sales when exploration or production would endanger vital state interests and resources; and

4. the adequacy of industry efforts to prevent an environmental accident and to minimize the adverse effects of such an accident should one occur.

Enclosed are the comments received from the Florida Departments of Commerce, Environmental Regulation, and Veteran and Community Affairs; the Southwest Florida, South Florida, East Central Florida, and Withlacoochee Regional Planning Councils; and the Sierra Club and the Sanibel-Captiva Conservation Foundation. We request that these, as well as our comments, be addressed in the Final Environmental Impact Statement.

Sincerely,

Walter O. Kolb
Sr. Governmental Analyst

WK/mew

August 6, 1981

WILLIAM WINTER
Governor

MISSISSIPPI DEPARTMENT OF WILDLIFE CONSERVATION

Bureau of Marine Resources
P. D. Drawer 959
Long Beach, MS 39560
(601) 864-4602
Enforcement Division - 374-3205

Commissioners:

Allen D. Bruton
Scooba, MS

L.C. "Billy" Gollott
Biloxi, MS

Dr. Edmund Kelser
Oxford, MS

Jim Hunter McCaleb
Cleveland, MS

Fred K. Rogers
Clinton, MS

RICHARD YANCEY
Executive Director

RICHARD L. LEARD
Bureau Director

Mr. Archie P. Melancon
Bureau of Land Management
18th and C Streets, N.W.
Washington, O. C. 20240

RE: CH# MSB10624-015-R Supplement to FEIS. Proposed Five Year OCS Oil and Gas Lease Sale Schedule

Oear Mr. Melancon:

The Bureau of Marine Resources is responsible for managing Mississippi's Coastal Resources, in cooperation with the Bureau of Pollution Control, the Bureau of Land and Water Resources, and the Oepartment of Archives and History. This cooperation is carried out under the Mississippi Coastal Program by procedures for state agencies to review proposed activities in the coastal area to insure that the activities are in compliance with the coastal program. The referenced activity has been reviewed, and its status, as indicated below, is hereby certified:

___ The coastal program does not cover the proposed activity. Mississippi has determined that Section 307 of the Coastal Zone Management Act does not apply.

_X_ The proposed activity is consistent with the coastal program. The review procedures of the program have been completed, and the requirements of Section 307 of the Coastal Zone Management Act have been met. Any agency comments received are attached.

___ This activity is conditionally consistent with the coastal program. The review procedures of the program have been completed, and the requirements of Section 307 of the Coastal Zone Management Act have been met, provided that the attached conditions are complied with.

___ This activity is not consistent with the coastal program and does not meet approval requirements under Section 307 of the Coastal Zone Management Act. The attached information explains the conflicts between the proposed activity and the coastal program, and explains the avenues of appeal and conflict resolution.

___ A certification of consistency with the coastal program is being withheld, without prejudice, due to insufficient information. Information requirements are attached.

___ The proposed activity cannot be reviewed, but may proceed subject to further coordination as indicated in the attached comments.

___ Other

If you have any questions concerning this matter, please contact our office.

Sincerely,

Richard L. Leard, Ph.O.
Bureau Director

RLL:mac

STATE OF MISSISSIPPI
OFFICE OF THE GOVERNOR

DICK MDLPUS
Coordinator
Federal-State Programs

GEORGE PARSONS
Director
Department of Planning and Policy

MEMORANDUM

TO: Bureau of Land Management
Department of The Interior
18th & C Streets, N. W.
Washington, D. C. 20240

DATE: August 14, 1981

FROM: STATE CLEARINGHOUSE FOR FEDERAL PROGRAMS

SUBJECT: REVIEW COMMENTS

Activity: The supplement considers a proposed five-year schedule consisting of 42 oil and gas lease sales in 17 areas of the Outer Continental Shelf.

State Application Identifier Number: MS810624-015-R

Location: Coastal Area Contact: Director

The State Clearinghouse, in cooperation with state agencies interested or possibly affected, has completed the review process for the activity described above.

A 95 REVIEW COMPLIANCE:

( ) We are enclosing the comments received from the state agencies for your consideration and appropriate action. The remaining agencies involved in the review did not have comments or recommendations to offer at this time. A copy of this letter is to be attached to the application as evidence of compliance with the A-95 review requirements.

(X) None of the state agencies involved in the review had comments or recommendations to offer at this time. This concludes the State Clearinghouse review, and we encourage appropriate action as soon as possible. A copy of this letter is to be attached to the application as evidence of compliance with the A-95 review requirements.

( ) The review of this activity is being extended for a period not to exceed 60 days from the receipt of notification to allow adequate time for review.

COASTAL PROGRAM COMPLIANCE (Coastal area activities only):

(X) The activity has been reviewed and complies with the Mississippi Coastal Program. A consistency certification is to be issued by the Bureau of Marine Resources in accordance with the Coastal Zone Management Act.

( ) The activity has been reviewed and does not comply with the Mississippi Coastal Program.

( ) Not Applicable

cc: Funding Agency (As requested by agency)

STATE OF LOUISIANA
DEPARTMENT OF CULTURE, RECREATION AND TOURISM
OFFICE OF PROGRAM DEVELOPMENT

DAVID C. TREEN
Governor

ROBERT B. DeBLIEUX
Assistant Secretary

MRS. LAWRENCE H. FOX
Secretary

August 3, 1981

Director
Bureau of Land Management (542)
Department of the Interior
18th and C Streets, N. W.
Washington, D. C. 20240

Re: Draft Supplement to the Final Environmenatl Statement
Proposed Five-Year OCS Oil and Gas Lease Sale Schedule
January 1982 - December 1986

Dear Sir:

We have no comment on the above-referenced proposed schedule at this time. We will be happy to review and comment on the Environmental Impact Statements from the individual sale tracts when they become available.

If you have any questions, please contact my staff at the Division of Archaeology and Historic Preservation.

Sincerely,

Robert B. DeBlieux
State Historic Preservation Officer

RBD/JKK/bc

DIVISION OF ARCHAEOLOGY AND HISTORIC PRESERVATION
P. O. Box 44247 Baton Rouge, La. 70804 504 342-6682

OFFICE OF THE GOVERNOR

September 21, 1981

Mr. Robert F. Burford, Director
Bureau of Land Management
Department of the Interior
18th and C Streets, N.W.
Washington, D.C.

Dear Mr. Burford:

The Budget and Planning Office recently conducted a review of the draft supplement to the final environmental impact statement pertaining to the Proposed Five-Year OCS Oil and Gas Lease Sale Schedule prepared by the Bureau of Land Management. The State Environmental Impact Statement Identifier Number assigned to the project is 1-06-50-040.

While it is acknowledged that these comments are being submitted after the August 10, 1981 suspense date, it is hoped that they will be useful to you in your decision-making process. If this office can be of further assistance, please do not hesitate to call.

Sincerely,

Leon Willhite, Manager
Intergovernmental Section
Budget and Planning Office

gg

Enclosures

State of California
GOVERNOR'S OFFICE
SACRAMENTO 95814

EDMUND G. BROWN JR
GOVERNOR

August 6, 1981

Honorable James G. Watt
Secretary of the Interior
Interior Building, Room 6151
C between 18th and 19th, N.W.
Washington, O.C. 20240

Dear Secretary Watt:

This letter and the attached are my and California state agencies' comments on the Draft Supplemental Environmental Impact Statement for the proposed, revised 5-year OCS Oil and Gas Lease Sale Schedule.

As I indicated in my July 23, 1981 testimony at your Department's hearing on the Draft SEIS, I believe your proposal to increase the area offered for lease by 30 times is ill-advised. Offering for lease areas ranging from nine million to 160 million acres will not increase oil and gas exploration. I believe offerings of that size will divert the resources of the oil industry from the exploration and development of those areas of the OCS that have the greatest hydrocarbon potential.

In addition, environmental documents for areas of the size contemplated will allow only a cursory review of non-oil and gas resources. These resources may be of great value to the nation and to citizens of the affected states. Failure to adequately consider environmental, economic and social values invite litigation that will delay outer continental shelf development.

Your April 1981 draft proposed 5-Year leasing program also includes revisions to the OCS leasing process that add to the violations of the OCS Lands Act that California, Alaska, the Natural Resources Defense Council and others identified in the suit over the June 1980 5-Year Program. The Draft SEIS appears to assume that all the changes to the leasing process described in the draft proposal will be implemented. I believe that a number of these procedural changes, such as doing away with tract selection, sub-planning-area resource estimates, and geohazards analyses, make compliance with Section 18 of the OCS Lands Act impossible. In my May 23, 1981 letter on this proposal, I requested that you consider

the impacts of these procedural changes in the Draft SEIS. You chose not to do so. Instead, you issued a proposed 5-Year Program. My detailed comments on changes to the leasing process will be included as part of my response to the July 24 proposal.

I also indicated in my July 23 testimony that the Draft SEIS does not adequately describe or analyze the environmental, economic or social impacts of the proposed program. The National Environmental Policy Act calls for environmental documents that provide decision-makers with the information they need to make reasoned judgements on the likely consequences of their actions. The Draft SEIS fails to accomplish this purpose. Describing the impacts of the revised program as the same as those of the old program, only more intense, is just not adequate. A sound decision on whether leasing 200 million acres of the OCS every year for the next five years is worth the risks can not be made based on a skimpy, 66 page compilation of generalized, unsubstantiated statements.

As you are aware, the above mentioned suit also asks the court to remand the June 1980 Program to the Department of the Interior because of inadequacies and violations of the National Environmental Policy Act. The Draft SEIS corrects none of the inadequacies or violations identified in that suit and exacerbates many of them. The details of California's objection to the June 1980 5-Year Program are contained in the following documents which I wish to have incorporated by reference into these comments:

1. April 3, 1979 testimony presented at Bureau of Land Management hearing on Draft EIS for the 5-Year OCS Leasing Program;
2. May 31, 1979 letter to Secretary Andrus transmitting recommendations on Interior's Draft Proposed 5-Year OCS Leasing Program;
3. September 9, 1979 letter to Secretary Andrus submitting comments on Proposed 5-Year OCS Leasing Program;
4. October 19, 1979 letter to Secretary Andrus transmitting comments on the 5-Year OCS Leasing Program Draft Environmental Impact Statement;
5. February 25, 1980 letter to Frank Gregg, Director of BLM, transmitting recommendations on Final Environmental Impact Statement on Proposed 5-Year OCS Leasing Program;
6. July 31, 1981 State of California v. Cecil O. Andrus, Petition for review of the National 5-Year OCS Leasing Program;

7. February 1, 1981 letter to Secretary Watt submitting comments on revision or reapproval of June 1980 5-Year OCS Oil and Gas Leasing Program;

8. May 23, 1981 letter to Secretary Watt transmitting comments on the April 13, 1981 draft proposed 5-Year OCS Oil and Gas Leasing Program.

The inadequacies of the Draft SEIS are described in detail in the attached comments from state agencies. However, I want to highlight two of the major inadequacies in this letter.

The SEIS continues your Department's refusal to adequately consider the onshore air quality impacts of OCS development. California is presently facing the sanctions of the Clean Air Act. Any onshore air quality degradation caused by OCS activities will have economic consequences for onshore development. California has proposed several solutions for controlling air emissions on the OCS, to no avail, and we and yourself are now in court on this issue.

The oil spill analysis presented in the SEIS is inadequate. The analysis is based on wind, wave and current conditions that are much calmer than those that prevail off the coast of California. The analysis also fails to consider the findings of the National Academy of Sciences on the incidence of loss of well control on the OCS. The findings are part of the "Safety and Offshore Oil" study performed by the Academy for the U.S. Geological Survey. Further, the SEIS fails to consider impacts associated with moving the oil produced on the OCS to refinery centers. As you are aware, it is the policy of California that OCS oil and gas be transported to refining centers by pipeline. We are committed to the use of pipelines to reduce the risks of oil spills and interference with other users of the coast and to minimize air pollution.

I recommend that you substantially revise the Draft SEIS and adequately respond to the deficiencies identified by myself and state agencies. The revised Draft SEIS should then be made available for review by State and local governments, the oil and gas industry, and the public. Also, the alternatives included in the draft do not offer the Secretary an adequate range of alternatives. I recommend that you include in the revised Draft SEIS an alternative that recognizes the concerns of this State as they have been expressed in these and past comments, and as they have been presented and upheld in court.

The additional alternative should delete from the 5-Year OCS Oil and Gas Leasing Program the Eel River, Point Arena, Bodega, Santa Cruz, and northern Santa Maria Basins, as well as the Santa Barbara Ecological Preserve and Buffer Zone, the Santa Monica Bay and the area directly seaward of San Diego County. Balancing the risks and benefits of OCS development

as is required by Sections 18 and 19 of the OCS Lands Act precludes leasing in these areas. Further, the California Coastal Commission has repeatedly determined that leasing in the four northern Basins and in the northern Santa Maria Basin is inconsistent with California's federally approved Coastal Zone Management Program. The alternative should also recognize the purpose and value of National Marine Sanctuaries and delete tracts within the sanctuaries off California from future lease sales.

Thank you for this opportunity to comment. I believe that a responsive, revised Draft SEIS will expedite the sound development of the OCS resources this nation needs.

Sincerely,

EDMUND G. BROWN JR.
Governor

Enclosures

State of California, Edmund G. Brown Jr., Governor

California Coastal Commission
631 Howard Street, 4th floor
San Francisco, California 94105
(415) 543-8555

August 8, 1981

James Watt, Secretary
Department of the Interior
18th and C Street
Washington, D. C. 20240

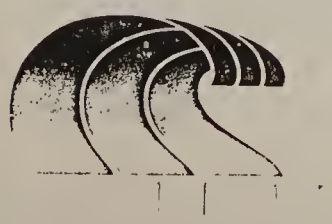
Dear Mr. Watt:

The California Coastal Commission has reviewed your Draft Supplement Environmental Impact Statement (DSEIS) on the national five year OCS oil and gas leasing program and has unanimously adopted the comments which are attached. In addition to the detailed comments, the Commission expressed its skepticism on the usefulness of making these comments since you have already announced the proposed program before receiving oral and written testimony from the public requested by your staff.

The most critical fault in the leasing schedule is the inclusion of the central and northern California frontier areas: the Eel River, Point Arena, Bodega, and Santa Cruz Basins. The Commission has found that leasing these areas would be inconsistent with the federally approved California Coastal Management Program because this frontier area has no existing industrial development along most of its coastline and could not support the facilities required for OCS development without drastically altering the character of the coast and subjecting it to high risks of damage from oil spills and to conflicts with commercial fishing activities. Therefore, it is pointless to include these areas in the leasing schedule.

The Commission supports leasing in those areas where onshore support facilities aleady exist or could be incorporated into the existing industrial infrastructure and where a thorough analysis of the cumulative impacts of the sale and previous sales in the areas indicates these effects could be mitigated to meet the policies of the California Coastal Management Program.

The Department of the Interior has proposed several new procedures for streamlining the OCS leasing process. The Commission is in favor of eliminating time-consuming and overly bureaucratic processes but is strongly opposed to changes that reduce public input at crucial points before a sale decision, such as tract selection, or that result in less information being available to DOI for decision-making, such as lack of availability of oil and gas resource data and geologic hazards information for specific areas. Such modifications do not improve the leasing process in either quality or responsiveness to state and local concerns and therefore violate the spirit of the OCS Lands Act Amendments of 1978.



Finally, the Department of the Interior should prepare an analysis of the impacts of the proposed program on national marine sanctuaries before a final program is adopted. The DSEIS does not adequately address the potential conflicts between the sanctuaries and OCS development activities.

Thank you for the opportunity to make these comments.

Sincerely,

MICHAEL L. FISCHER
Executive Director

MLF:MG:nc

Attachment

cc: Robin West
William Grant
Deni Greene

JOHN SPELLMAN
Governor

To: 540

DONALD W MOOS
Director

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
Mail Stop PV-11 • Olympia, Washington 98504 • (206) 753-2800

August 10, 1981

Director
Bureau of Land Management
Department of Interior
18th & C Streets N.W.
Washington, D.C. 20240

Dear Director Burford:

Thank you for the opportunity to comment upon the Bureau of Land Management's Draft Supplement to the Final Environmental Statement-Proposed Five-Year OCS Oil and Gas Lease Sale Schedule.

Subsequent to review of the DSEIS by various state agencies, Washington offers the following comments:

The Final EIS on the Five-Year OCS Schedule assesses the environmental impact of a lease program covering approximately 20 million acres. Now the Department of Interior has requested comments on a draft supplement to the Final EIS which contains alternatives to the program adopted in June 1980. Essentially, the Interior Department's preferred alternative defines a scope and approach which radically departs from the current program. The State of Washington questions the appropriateness and validity of issuing a mere supplemental EIS on this proposal which presumes to offer an unprecedented 1,200 million acres of federal OCS for lease. Furthermore, the review deadline for the DSEIS had not even expired when the Secretary of Interior announced his decision on the new OCS program. Such a hurried approach to redeveloping the OCS lease program promotes misunderstanding and lack of cooperation between federal and state authorities.

Page 32 of the DSEIS describes the anticipated onshore impacts of the proposal. Although the document concedes that impacts may result in non-lease areas, including Washington and Oregon, there is no definition of the types and number of facilities which will be necessary under the proposed program. In addition, the DSEIS makes no mention of the impacts of the proposal on the commercial fishing industry in the Pacific Northwest. Washington-reared salmon stocks inhabit marine waters and estuaries which will be subjected to the effects of exploratory drilling and development. Should offshore operations be conducted in an unsafe manner, considerable resource damage could result. Already, the State of Washington has been adversely affected by geophysical surveying which caused the loss of an estimate 1,000 crab pots. This incident discloses the type of impact which can be expected to magnify given the proposed

accelerated program. The DSEIS states on page 4 that, under the Call for Information, tracts may be deleted from planning because of overriding concern. Washington would like to know whether the Department of Interior intends to use cost/benefit analyses to determine areas of "overriding concern." If so, such an analysis should recognize the limitations of this type of economic evaluation and should consider the worst possible case scenario so that the full implications of leasing in, say an environmentally sensitive area is understood.

The DSEIS claims in Appendix I that increased OCS hydrocarbon production can result by simply offering greater acreage for lease. However, the realities of petroleum exploration and the current offshore outlook, i.e. record high interest rates, growing crude surplus, declining prices and tremendous economic risks, are never mentioned. Exploratory efforts in Cook Inlet, Gulf of Alaska, and South and Middle Atlantic have failed to produce any petroleum. There is no acknowledgement of this fact in the DSEIS or explanation of how this unfavorable history will affect the industry's response to a greatly expanded and accelerated program. In fact, industry has consistently argued that quality acreage is far more important than quantity. The direct correlation between the amount of acreage leased and the amount of petroleum produced has not been demonstrated and remains purely speculative.

The size, timing and location of offshore leases must be such that proper environmental assessments can be made. The preferred alternative described on page 7 of the DSEIS proposes to perform an environmental assessment on an entire planning area. It appears highly unlikely that an environmental assessment can be performed on immense planning areas with the level of precision necessary to make prudent resource management decisions. One such planning area, the Aleution Arc, approximates the size of Texas. The DSEIS does not give adequate explanation of how the BLM can complete area-wide environmental assessments and still comply with applicable environmental laws, including the OCS Lands Act and the National Environmental Policy Act. The proposal promises to consider specific environmental issues when actual drilling and development plans are being considered. This approach effectively eliminates any critical review of the proposal until industry has made a financial commitment. It is inconceivable (and possibly illegal) to delete offshore tracts from development once leases are granted.

Legitimate environmental concerns are mollified in the DSEIS with the statement on page 17, "Impacts resulting from the proposal will be the same as those expected for the present schedule, they will only differ in intensity." Some of these impacts could be mitigated through a coordinated planning process. It should be noted in the DSEIS that while Interior is proposing to increase the pace and extent of offshore leasing, coastal planning funds intended to ameliorate anticipated impacts are proposed to be eliminated.

A review of the DSEIS raises many serious questions concerning the feasibility of the proposed program. The haste with which the document was prepared is reflected in the gross number of typographical errors, calling into question the very accuracy of the information presented. The most significant problem presented by the DSEIS is that it does not answer some fundamental questions about the magnitude of anticipated impacts and therefore does not satisfy the basic information needs of the coastal states. In summary, the State of Washington does not find the Department of Interior has adequately demonstrated how the proposed changes to the OCS lease program will contribute to greater offshore production or how the integrity of the offshore and onshore natural systems will be reasonably protected.

Sincerely,

Don McKisson (For Duane Wegner)
Duane Wegner
Shorelands Division Supervisor
Office of Land Programs

DW:m

STATE OF ALASKA

JAY S. HAMMOND, Governor

OFFICE OF THE GOVERNOR

DIVISION OF POLICY DEVELOPMENT AND PLANNING
Governmental Coordination Unit

POUCH AW (MS-0165)
JUNEAU, ALASKA 99811
PHONE: (907) 465-3565

August 11, 1981

Mr. Robert Burford, Director
Bureau of Land Management (542)
U.S. Department of the Interior
18th and C Streets, N.W.
Washington, D.C. 20240

Dear Mr. Burford:

The State of Alaska has reviewed the Draft Supplement to the Final Environmental Statement on the Proposed Five-Year OCS Oil and Gas Lease Sale Schedule (January 1982 - December 1986). We have several general comments regarding the Draft Supplement and the proposed OCS program. Specific additional comments on the document are attached to this letter. Our comments at this time expand on our earlier response to the draft program submitted on May 22, 1981, and should be considered in conjunction with those previous comments. Before October 22, 1981, we will be submitting further detailed comments and recommendations on the revisions to the proposed schedule announced on July 15, 1981.

The State takes this opportunity to voice, once again, its strong objections to Interior's proposed acceleration of the OCS leasing schedule. The draft proposal, Alternative 1 in the Draft Supplement, and the recent revisions of the five-year lease schedule continue to concentrate early development activity in the high-risk frontier areas off Alaska's coast and fail to balance adequately the potential for adverse environmental, social, and economic impacts with the potential for recovery of oil and gas, as required by the OCS Lands Act Amendments of 1978.

Federal offshore leasing in the Alaska OCS must be viewed as only one facet of a comprehensive energy exploration and development strategy for Alaska, to be coupled with federal onshore leasing initiatives and the State's own leasing program. The State believes that timing and location of leasing in hazardous offshore waters should be delayed and planned to complement earlier leasing of onshore areas of promising resource prospects and safer operating conditions. The State's position on an adequate federal OCS leasing program thus recognizes the need for additional time in frontier areas to develop safe exploration and development techniques, ensure realistic transportation methods, and design measures for the successful mitigation of potential

adverse effects. However, the current federal OCS leasing proposals in Alaska ignore these considerations and instead emphasize expedited entry into areas where the information base and technology to proceed safely have not yet been developed. Alternative 1 in the Draft Supplement clearly places on the State of Alaska and its residents an inequitable burden of the risks and impacts from OCS development.

The newly revised leasing schedule, announced on July 15th, makes only minor adjustments to the leasing schedule that Secretary of the Interior James Watt proposed in April, 1981. The new revisions reflect input from industry alone and do little to alleviate State concerns about the preliminary schedule. The number of sales in the Alaska OCS region remains unchanged. The St. Matthew-Hall Basin, an area of very low oil and gas potential, was dropped from the lease schedule. The State supports this deletion. However, a second Navarin Basin sale was also added to the schedule for 1986. Consistent with the State's position on the first Navarin Basin sale in 1984, this second sale should be conditional upon the timely development of adequate operating techniques, mitigating measures, and local coastal management plans. Furthermore, the fisheries-rich St. George and North Aleutian basins still remain on the lease schedule. The State continues to oppose the inclusion of lease offerings in these basins of the southeastern Bering Sea within the period of the five-year schedule.

The Draft Supplement adds little, other than unverified generalities, to the consideration of an appropriate federal offshore leasing program. Alaskans are notified that "The most substantial changes anticipated with the adoption of this Alternative (No. 1) would be in the Alaska OCS where the greatest amount of acceleration and new activity would result" (page 28). The Draft Supplement admits Interior's inability to predict the level of new activity which would be generated under the proposed OCS program. Expected impacts in Alaska are repeatedly cast as "considerably greater," "increased," or "substantial" in the Draft Supplement. While this result is obvious, the draft provides no assessment of these impacts or any basis for a predictive analysis of impacts.

Of the alternatives presented in the Draft Supplement, Alternative 5 most closely approximates the State's preferred schedule for federal oil and gas leasing off Alaska's coast by delaying or dropping sales in the North Aleutian, St. George, Navarin, Norton, Hope and Barrow Arch Basins. We have repeatedly advocated a federal OCS leasing schedule (most recently in the Governor's May 22, 1981, letter to Secretary Watt) which addresses the Nation's near-term need for energy resources while providing for both National and State long-term interests in renewable marine resources, most notably fisheries. Delaying sales in portions of the Alaska OCS, as outlined in Alternative 5 of the Draft Supplement, would allow time for advancements in technology, environmental data, and local and State land use planning for onshore impacts. The State also notes, with considerable interest, that the more moderate pace of leasing in the Alaska OCS, as embodied in Alternative 5, would fall "only slightly behind" the OCS inventory and production goals sought under Interior's Alternative 1 but would substantially reduce or eliminate many impacts in the eastern Bering Sea" (pages 24 and 66). The minor revisions in the OCS schedule, announced on July 15th, would not likely alter the above assessments.

Even Alternative 5, however, substantially departs from the State's preferred OCS leasing program because of the effects of the streamlining procedures proposed concurrently by Interior. Basin-wide offerings and the elimination of the tract selection step would preclude site-specific, pre-sale planning which is essential for a reasonable balancing of environmental and economic costs and benefits required of the Secretary under the Outer Continental Shelf Lands Act Amendments of 1978. Furthermore, the streamlining procedures, when coupled with projected federal cuts to the Environmental Studies Program and the Coastal Energy Impact Program, would diminish State and local ability to participate in the development of mitigating measures because of the lack of an adequate informational base for the basin-wide regions to be leased under the proposed revised schedule. The ability of the State and of coastal communities to plan for the increased onshore impacts expected as a result of the dramatically increased size of sale areas also would be substantially impaired by the streamlining proposals. Therefore, the State would support the "planning area" concept outlined in the Draft Supplement only if the tract selection milestone is retained and federal funding of OCS research and planning programs is adequate to predict and prepare for potential impacts.

The OCS public hearings held in Anchorage on July 22 and 23 demonstrated the level and breadth of public sentiment in Alaska regarding Interior's proposed OCS program. With the exception of five industry representatives, all witnesses voiced vigorous opposition to the proposed acceleration of OCS lease sales in Alaska. Notably, thirty-five of the approximately 70 witnesses presented testimonies from their local communities via the State's tele-communications network. These private citizens and representatives of Native organizations and local governments from Ketchikan to Barrow voiced concerns about the anticipated onshore impacts, inadequacy of environmental data, impacts on existing transportation infrastructure (particularly during exploration), oilspill impacts on and activity conflicts with the fisheries industry, and the need for adequate time for local coastal management planning. The public sentiment was strong and virtually unanimous: the proposed schedule is too much, too soon.

The attached summary presents Alaska's concerns regarding the Draft Supplement to the Final Environmental Statement in more detail. The State will be submitting further comments and recommendations on the revised schedule which was announced on July 15, 1981, and sent to us for review on July 24th. Thank you for the opportunity to comment on this document.

Sincerely,

James M. Souby
Director

Enclosure

STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF PARKS

JAY S. HAMMOND, GOVERNOR

619 WAREHOUSE DR., SUITE 210
ANCHORAGE, ALASKA 99501
PHONE: 274-4676

July 31, 1981

Re: 1130-9-4

Director
Bureau of Land Management (542)
DOI
18th & C Streets, N. W.
Washington, D. C. 20240

Subject: Draft Supplement to FEIS: Proposed 5 Year OCS Oil & Gas Lease Sale Schedule

Dear Sir/Madam:

We have reviewed the subject proposal and would like to offer the following comments:

STATE HISTORIC PRESERVATION OFFICER

We concur with the conclusion paragraph (2nd paragraph down) on P. 33 regarding cultural resources. We look forward to participating in the consultation process with regard to this proposal as prescribed in Title 36, Code of Federal Regulations, Part 800.

Robert D. Shaw
State Historic Preservation Officer

STATE PARK PLANNING

The proposed action is consistent with the Alaska Coastal Management Program's recreation standard.

LAND AND WATER CONSERVATION FUND GRANT PROGRAM

No Comment.

Sincerely,

Chip Dennerlein
Director

CD:mlb

10-J11LH

COMMENTS FROM LOCAL GOVERNMENTS

BERING STRAITS COASTAL RESOURCE SERVICE AREA BOARD
c/o City of Unalakleet
Box 28
Unalakleet, Alaska 99684
(907) 624-3531

Harry V. Boone
Golovin, AK 99762
Paul Rookok
Box 155
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Teller, AK 99778
Frances Degnan
Box 33
Unalakleet, Ak 99684
Dwight Milligrock, Sr.
Box 158
Nome, AK 99762
Andrew Daniels
Elim, AK 99739
Morris Coffey
Stebbins, AK 99671

31 August 1981

Director
Bureau of Land Management (542)
Department of the Interior
18th & C Streets N.W.
Washington, D.C. 20240

Dear Sir:

This letter is in reference to the recently released Draft Supplement to the Final Environmental Statement. This involves the proposed five year OCS Oil and Gas Lease Sale Schedule, and a number of alternatives to the schedule. I have recently been employed by the Bering Straits Coastal Resource Service Area (BSCRSA) Board to develop an approved coastal plan for this region. Therefore, my following remarks will relate specifically to the Bering Straits - Norton Basin lease sale.

Much of the resource information in the Bering Straits - Norton Basin region is sketchy and reconnaissance in nature. Detailed information is sorely lacking, and there are numerous gaps in the existing reports. It is a major goal of the BSCRSA Board to compile a Resoure Library for this region, and from this and related information to develop an approved coastal zone management plan. The current timeframe indicates this regional plan will not be completed for another three years.

We are extremely concerned that the present schedule for leasing the Norton Basin indicates that this area will be leased prior to the development of an approved plan. We feel that this precludes proper planning and negates the importance of a coastal zone management plan.

We respectively request that Norton Basin leasing be delayed until a coastal zone plan for the Bering Straits Region is formulated and approved.

Shishmaref, Wales, Diomede, Brevig Mission, Teller, "Nome West", White Mountain, Golovin, Solomon, Council, "Nome East", Elim, Koyuk, Shaktoolik, Unalakleet, Stebbins, St. Michael, Gambell, Savoonga

The BSCRSA Board has a number of other concerns as it relates to the proposed leasing schedule in Norton Basin. They feel that the Draft Supplement and Final Impact Statement are too general and do not adequately address the possible adverse effects that may occur. Additionally, they feel that not enough attention is given other resource values that exist in this area. These will be covered in greater detail at a later date.

We thank you for your consideration in this matter, and seriously request you delay Norton Basin leasing until the region has an approved coastal zone management plan.

Sincerely yours,

BERING STRAITS COASTAL RESOURCE
SERVICE AREA BOARD

Diane Hemnes
Diane Hemnes, Coordinator

DH:cn

cc: Sylvia Spearow, CRA
Michelle Shook, OCM
Board Members, BSCRSA
files

BRISTOL BAY NATIVE ASSOCIATION
P.O. BOX 189
DILLINGHAM, ALASKA 99576
PHONE (907) 842-5257 — 842-5258

TO: Esther Wunnicke
Director, Alaska OCS Office

FROM: Jane Koenitzer
OCS Coordinator

DATE: July 22, 1981

RE: Testimony Given on Draft Supplement to the Final Environmental Statement: Proposed 5-Year OCS Schedule

Planning Efforts

I would like to begin by mentioning several planning activities at the local, state and federal levels currently being initiated that will closely parallel some of the efforts of the Alaska OCS Office. A Bristol Bay OCS Advisory Committee has been formed to inform the residents and organizations of the issues and decision-point milestones emminating from the federal and state leasing processes. Unfortunately, there is no local expertise with which to develop or interpret scientific and technical development alternatives. Nor does the capability exist to fully understand resource potentials and the identification of all the development parameters which must be evaluated with resource development and exploration.

Secondly, the Bristol Bay region has been designated as a Coastal Resource district under the State of Alaska Coastal Zone Management Plan. The formation of a Coastal Resource Area Board will take place in early 1982. It is anticipated that a normal three year investigative, planning period will lapse (in 1985) before a Coastal Management Plan is adopted and/or implemented.

The State of Alaska is currently completing a Bristol Bay Resource Inventory. This inventory will fulfill baseline data requirements for the State's oil and gas leasing process, while at the same time begin the study phase work of the Coastal Resource Service Area Board once formed. The Resource Inventory will also serve the cross-purposes of the Bristol Bay Cooperative Management Plan mandated by the "Alaska National Interest Lands Conservation Act."

It should be noted that the initial funding for the Bristol Bay Resource Inventory was money earmarked for the Bristol Bay Coastal Resource Service Area Board. It was agreed amongst local groups that the completion of the Resource Inventory by the Department of Natural Resources will expediate the coastal planning efforts of the yet unformed Coastal Resource Service Area Board.

Draft Supplement to FEIS: Five Year OCS Lease Schedule

The draft supplement to the final environmental Statement for the proposed 5 year OCS lease schedule addresses many of the concerns that have been expressed with regards to lease sales in the St. George Basin, the North Aleutian Basin and the Navarin Basin.

Two areas of special concern addressed in the supplement are a change in the leasing process and discussion of Impacts on Commercial fishing activities. Within the discussion concerning the Administrative framework, subdivision of the planning areas is contingent upon several factors, amongst which is "special environmental concerns." There is no specific language dictating the appropriate classification or identification of special environmental concerns. Locally generated concerns and industry generated concerns are often time at lager-heads. It would seem that those with a more holistic approach to a particular eco-system would be best able to identify special environmental concern!

It is not hard to standardize information with the use of statistics and probability inference. Nor is it hard to be mis-guided by such planning and estimation methodologies. Opening up entire planning areas and then seeking exemptions for specific sites seems to be relegating legitimate concerns for the natural order to a secondary status. In much of the bush natural processes are of primary concern out of a need for survival and existence.

As mentioned previously, there is no local expertise to digest the multitude of information and assess mitigative measures for possible resource conflicts. A more active federal effort to support both financially and with technical assistance would be most appropriate. This would not only lead to clearer information, but would offer the avenue for participation by entire communities circumscribed by proposed planning areas.

Secondly, are concerns over the discussion about the fishermen's contingency fund for the North Aleutian Basin (p. 38). As mentioned, delays in funding such an insurance program can result in lost fishing time. What is not mentioned explicitly is the loss of income from gear loss and conflicts. This is especially critical for salmon fishermen. It only takes one or two tides to make a fishermen for the season. Due to the logistics of moving into and out of the fishing districts, gear loss could mean loss of a total season. Unless, there is some monetary compensation for income lost then the discussion grossly underestimates the potential impacts of gear conflicts and more importartly oil spills.

As far as the actual schedule of lease sales goes Alternative #5 appears to be the most reasonable. This schedule will not only minimize total impacts throughout the entire federal OCS holdings but also provides a reasonable

time frame in which to assess the urgency and identity of the purposes and goals of the OCS Lands Act.

Alternative #5 will also provide the time necessary for local coastal management plans to be formulated and complimented. The delay or deletion of several identified sites in the OCS would also help mitigate some of the impacts anticipated from state and federal upland lease sales.

Conclusion

In conclusion, we ask that alternative #5 be adopted, that additional delays or deletions include the St. George Basin and North Aleutian Shelf, that funding be continued to achieve the goals and purposes of the Coastal Zone Management Act and that funding be available to develop local expertise on OCS development, planning and implementation. The Bristol Bay Native Association has not said "no" to OCS development; we ask for more time and funding to study its impacts so that educated decisions may be made.

CITY OF KAKTOVIK

POST OFFICE BOX 109

KAKTOVIK, ALASKA 99747

July 29, 1981

Director
Bureau of Land Management (542)
Department of the Interior
18th and C Street, N.W.
Washington, D.C. 20240

To the Director:

The City of Kaktovik is filing these comments on the Draft Supplement to the Final Environmental Impact Statement/Proposed Five-Year OCS Oil and Gas Lease Sale Schedule/January 1982-November 1986 (hereafter, the "DS").

We commented on the Draft EIS on the Five Year OCS Lease Schedule and we also sent in comments in January, 1981, about the proposed changes in the Five Year OCS Lease Schedule. Since the DS is based on these earlier documents, we include all these earlier comments here by reference.

The people of our village believe that the government and the industry are moving too fast in the offshore leasing in the Arctic Ocean. The fish and marine mammals that we need to have for our health and survival swim through the Beaufort Sea lease area, which you are now calling the "Diapir Field". The whales we depend on migrate from the Norton Sound, past Point Hope (in the "Hope Basin"),through the Chukchi Sea (you call it the "Barrow Arch" lease area) and then the Beaufort Sea. All of these areas are scheduled for leasing. And the place where the whales end up, the Canadian Beaufort Sea, is also a place where offshore drilling is now going on.

We believe that all the Arctic Ocean sales should be dropped from the five year schedule. That means the Beaufort Sea sales ("Diapir Field"), Chukchi Sea sale ("Barrow Arch") and Hope Basin sale. We are NOT saying that these areas could never be leased. But any more leasing in the Beaufort Sea, and any leasing in the Chukchi Sea and the Hope Basin should wait until industry has developed technology for safe drilling and cleanup

in all ice and weather conditions that we have every year. The offshore areas that have already been leased in the 1979 Beaufort Sea lease sale should not have been leased until the drilling and clean up technology were safer. But now that the lease sale has happened, these tracts are a place where the industry can develop the skills needed to work in other Arctic areas. More areas in the Arctic Ocean should not be leased until the industry knows what is doing up here.

If the government refuses to take these sales out of the Five Year Lease schedule, then the "no action" alternative (number 3) or the "extension of present schedule to December, 1986" alternative (number 2) should be chosen. We think the present five year lease schedule opens too many Alaskan OCS areas up for leasing, and we do not agree that these areas should be leased. But the present schedule is far better than the new schedule proposed by Interior Secretary Watt for one big reason: the old schedule calls for leasing limited areas in each part of the coast. The new schedule has the "streamlined" system of opening up entire Seas to leasing.

The present lease schedule includes calls for nominations, and consideration of information from industry, local residents and local governments, environmental organizations and others. Then a limited part of the area being considered is actually picked as the possible lease area. Environmental studies can then be made of this limited area, and the industry can concentrate its seismic and other testing in that area.

We are told in the DS that the new lease schedule, and any of the alternatives based on the new lease schedule, will also have a call for information for the entire areas. But tracts will be deleted only for reasons like "national defence". Otherwise the entire planning area, like the entire Beaufort Sea or the entire Chukchi Sea, would be opened to industry leasing. "Environmental Impact Statements" for such big areas will not be worth anything to the public or the government. There is no way that the EIS could really bring out all the dangers and all the necessary information about the effects of offshore drilling in such large areas.

The proposed five year lease plan is simply a blind rush to lease the maximum acreage possible with practically no concern for environmental and the social costs of the OCS exploration activities. The newspaper reports about the oil industry reaction to the schedule are interesting. Even the industry seems to be saying that the new leasing schedule is too much, too fast. It seems enough information and maybe even enough money will NOT be available to deal with

all the acres (one billion acres in the entire US coastal areas) that are being opened up.

The trust responsibility that the government has for the native people along Alaska's coast was being broken by the present lease schedule. I know that the North Slope Borough has asked the Court of Appeals in Washington, D.C. to stop the leasing under the present schedule because it breaks that trust responsibility. The case is called North Slope Borough v. Andrus. The proposed new lease schedule is even worse, and should also not be allowed to go ahead for this reason.

The whole issue of Inupiat Eskimo title to the Arctic Ocean beyond the three mile limit of the State is also in court in a case called Inupiat Community of the Arctic Slope v. United States of America. The leasing under both the present schedule or this new one discussed in the DS should be stopped until these claims have been decided.

Although Kaktovik is not an actual plaintiff in either of these lawsuits, we reserve any rights we may have by the court decisions in these cases.

A final, general point must be made. Recent newspaper reports in Alaska quote both Interior Secretary Watt and members of his staff as being determined to carry on with the new, proposed leasing schedule described in the DS. He considered some comments received from governors of states, but he is deciding to go ahead with this schedule and the system of offering whole planning areas for leasing at the same time.

Our village is wondering why we should waste our time making written comments on the DS. And why should people show up at the public hearings? Before the public hearings, and long before the deadline for written comments, we find the decision-maker clearly telling all of us that his mind is made up. He will go ahead no matter what we say!

We know that our village is a long ways from Anchorage and Juneau and Washington, D.C. But WE are the people who live on the coast, and WE are the people whose life will be damaged by the drilling and the oil spills. The health of our village elders and our children and all of us is on the line. The government is proposing things that will drive away the fish, whales and seals. And oil in the water will make the meat of the wildlife full of chemicals that can cause cancer and other diseases in local people like us.

The ocean is like our garden. We feed on it, and we

do not have any choice. The government must come to its senses and slow down this OCS leasing in the Arctic Ocean that is threatening to wipe out the future of our village.

We hope that despite the newspaper reports, the government will consider these comments. We will be waiting for a response from you. More detailed comments about the DS are attached to this letter.

Sincerely,

CITY COUNCIL OF KAKTOVIK

BY: Archie K. Brower
ARCHIE K. BROWER
Mayor

AKB/mij

MAUNELUK ASSOCIATION
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August 7, 1981

Esther C. Wunnicke, Manager
Alaska OCS Office
P.O. Box 1159
Anchorage, Alaska 99510

RE: Proposed Five-Year OCS Oil and Gas
Lease Sale Schedule, Draft SEIS

Dear Ms. Wunnicke:

These comments are written on behalf of the Northwest Arctic Coastal Resource Service Area (CRSA) Board, on elected body representing the eleven (11) communities of the NANA Region. The CRSA Board is authorized under the Alaska Coastal Management Act to prepare a coastal management plan for the NANA Region, and a draft CMA will be completed in 1982. The Board appreciates your request for resource information on the proposed OCS lease sales in Alaska.

These comments apply primarily to lease sale 86 in the Hope Basin; but they can be extrapolated to apply to sale 85 in the Barrow Arch and to sales 57,88, and 99 in the Norton Basin. Please note that any oil and gas exploration and development in these adjoining lease sale areas will have direct impacts upon the coastal resources of the NANA Region. These direct impacts arise in part from:

1. Seasonal marine mammal migrations, including the movement of 10 species of whale, 6 species of seal, and walrus;
2. Adjoining seabird and raptor nesting areas, and seasonal waterfowl migrations;
3. Seasonal fish migrations, including those of salmon, sheefish, char and herring;
4. The siting of onshore support facilities and the resulting demands upon regional utilities and transportation facilities;
5. Socio-economic disruption as a result of inter and intraregional relocation by individuals;
6. Seasonal movement of pack ice.

MEMBER VILLAGES
Ambler, Buckland, Deering, Kiana, Kivalina, Kobuk, Kotzebue, Noatak, Noorvik, Selawik, Shungnak

361-b

For over a year the Northwest Arctic CRSA Board has been conducting inventories and analyses of the natural and human resources in the coastal zone. From this effort one concludes that there are fundamental environmental data gaps for the Hope Basin lease sale area. A serious research effort must be initiated prior to the lease sale to inventory offshore resources and to avoid post-sale delays. Information is needed on:

1. Pack ice movement, and the hazards of pollutants or discharges when pack or shore ice are present;
2. Offshore and coastal currents, and the hazards of pollutants or discharges to migrating species of marine mammals, fish and waterfowl;
3. The extent of subsea permafrost, and the hazards of drilling into it;
4. Shoreline and estuarine sensitivity, and the seasonal use of these areas by various species;
5. The marine invertebrate ecology; with emphasis on food chain links;
6. Seasonal migrations of arctic char, sheefish and herring into the OCS lease area;
7. The effects of surface and submarine noise on marine mammal distribution.

The CRSA Board is concerned about the potential impacts of oil and gas related activities in the Hope Basin on: the abundant subsistence resources of the region including marine mammals, fish and birds; and important coastal habitats adjacent to the lease sale area. Some of the habitats include:

1. A nutrient gyre near Cape Espenberg;
2. A barrier system from Wales to Cape Espenberg which is an important spawning and nesting area;
3. Seabird colonies at Chamisso Island, Cape Lisbourne and Cape Thompson;
4. A swan staging area between the Noatak Delta and Shesholik Spit;
5. A beluga calving and hunting area at Eschscholtz Bay;
6. A perennial flaw-zone between Wales and Point Hope

which is important to the movements of marine mammals, seabirds and polar bear;

7. Shore-fast ice zones used by ring seals for breeding and pupping;
8. A polynya between Cape Krusenstern and Point Hope;
9. A sheefish migration area at Kobuk Lake (i.e. Hotham Inlet); and
10. A traditional seal hunting area at Sealing Point, Cape Krusenstern.

One additional, important point needs emphasis. The final SEIS should consider the potential cumulative impacts of oil and gas activity in the Hope Basi area. None of the proposed leasehold operations, including OCS, NPR-A, Uplands, State leases and native corporation leases have looked at the cumulative impacts. Each seems content with its personal myopic view. Surely, OCS-BLM with its experience, accumulated data base, skilled workforce and current mandate to hasten oil and gas activity is best positioned to undertake this heightened view of total developmental impacts. The creation by Congress of the Cape Krusenstern, Noatak, Kobuk, Selawik and Bering Land Bridge National Parks, Monuments and Preserves clearly indicates that in the Hope Basin area there are resources of national dimension to rival oil and gas.

Thank you for this opportunity to comment. Please keep the Northwest Arctic CRSA Board advised of OCS-BLM activities.

Sincerely,

Peter C. Gamache
Coastal Management Planner

cc: Marie Schwind, Maniilaq Association
Director (542), BLM
Gretchen Keiser, DPDP
Michelle Shook, OCM
Roger Maggard, DCRA
Ralph Darbyshire, Consultant
John Schaeffer, Jr., NANA Corporation

PCG/lmm

MONTEREY COUNTY

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July 17, 1981

Director
Bureau of Land Management
Department of the Interior
18th and C Streets, N. W.
Washington, D. C. 20240

Dear Sir:

In response to the *Supplement to the Final Environmental Statement Proposed Five-Year OCS Oil and Gas Lease Sale Schedule*, the County of Monterey offers the following:

Monterey County strongly opposes inclusion of OCS sales in those areas where information is insufficient to adequately evaluate the economic, environmental and social impacts of leasing, or where the known risks to the environment, the existing economy, or to marine traffic are high.

For these reasons, we have objected to leasing in the middle three basins of Lease Sale #53 and all of lease Sale #73. Further, the County now opposes to accelerated five-year leasing schedule because it precludes the inclusion of critical environmental information needed to meet the requirements of the OCS Lands Act, increases overall impacts to the environment, and represents such a massive switch in resources available involving so great an area that it is impossible to keep up with it. The scale of the project and the increased adverse environmental effects make the accelerated lease sale unacceptable. Likewise, even after adequate studies of the impacts of leasing in the Santa Cruz and Santa Maria Basins have been completed, it is likely that Monterey County will not find leasing acceptable in the Santa Cruz and northern end of the Santa Maria basin where the resource potential is low and which includes the prime habitat of the southern sea otter, high yield fisheries, high concentration of sea birds and marine mammals, and gray whale migration routes.

I hope you will receive these comments in the spirit in which they are intended: that of reducing the potential of future conflict between the Department and the County. We appreciate the opportunity you have given us to make our concerns known.

Sincerely,

Barbara Shipnuck

BARBARA SHIPNUCK
Chairwoman Board of Supervisors

BS/eam

Nantucket Land Council, Inc.
Old Town Building
Post Office Box 502
Nantucket, Massachusetts 02554
617-228-2818

June 30, 1981

Director
Bureau of Land Management (542)
Department of the Interior
18th and C Streets, N.W.
Washington, DC 21240

Dear Sir:

After careful reading of the Proposed Five-Year OCS Oil and Gas Lease Sale Schedule this organization strongly urges the implementation of Alternative 3. The arguments for an accelerated leasing system are not convincing. Under the present system the areas with the greatest potential for oil are leased. If one's goal is to produce oil, such an approach is rational; and, at the same time, it maintains some control over oil drilling and thus the environmental impact resulting from such activity. Oil and fishing could both exist and the interests of fishermen and conservation are not totally ignored.

The proposed leasing scheme fundamentally changes this. Not only is the environmental damage greater because of the increased rate and size of sales, but the emphasis has switched completely to oil interests. The oil companies would gain access to huge areas of prime fishing grounds with little to impede them as one must show "overriding concern" to have areas deleted from a sale. This will most likely be impossible to do as fish do not come in nice neat patches. The biology of fish dictates that large areas are needed to maintain a population of fish. This also becomes increasingly true as our ability to locate certain fish species becomes greater. Oil, on the other hand, comes in locatable patches which do not move around.

The previous leasing system was at least rational in that it respected these facts. One could decide that the environmental damage to a localized area was justified to extract oil. Under the proposed system one can no longer make that decision. The oil companies are free

to drill anywhere in huge planning areas and therefore environmental damage becomes widespread. The protection of fish becomes nearly incidental. One cannot argue that drilling would remain localized; the entire purpose of the proposed changes is to encourage more drilling.

The reasoning behind this fundamental change is that we suddenly need to inventory all our oil reserves. This is unnecessary for several reasons. The oil will not disappear. As offshore drilling takes place new areas of potential will be discovered and can gradually be used following a rational plan. The inventory will simply be slower. In addition, by pushing for an immediate inventory and vastly increased drilling, one is not encouraging a lessened dependence on oil, but simply encouraging current levels of consumption. It does nothing to solve the long range problem.

Some also argue that we need the oil for economic reasons. The increased oil availability may stabilize one sector of our economy, but the drain on available capital will undoubtedly disrupt other sectors and thus not improve the overall economic situation. Again, a short range solution is being pushed.

We see no overriding need to accelerate the leasing programs and would like to see the present schedule and procedure maintained. Thank you.

Very truly yours,

John H. Roe
Executive Director

JHR:jw

NORTH SLOPE BOROUGH
OFFICE OF THE MAYOR
P.O. Box 69
Barrow, Alaska 99723

Phone: 907-852-2611

August 10, 1981

Mr. Robert J. 8radford, Oirector
Bureau of Land Management (542)
Oepartment of the Interior
1Bth & C Street, N.W.
Washington, O.C. 20242

Oear Mr. 8radford:

The North Slope Borough submits the following comments on the Oraft Supplemental Environmental Impact Statement (OSEIS) concerning the Interior Oepartment's proposed five-year OCS oil and gas lease sale scheduled for the period from January 1982 to Oecember 1986. They supplement the comments already submitted by the 8orough on May 15, May 21 and June 22, 1981.

As OSE1S admits (p. 17), the proposed program is a "radical departure" from the June 1980 5-year OCS program. The magnitude of that departure is apparent in the OSEIS. The core alternative (Alternative 1) schedules 3 area-wide lease sales in the Oiapir Field (8eaufort Sea) and 1 area-wide lease sale in the Barrow Arch (Chukchi Sea) over the next 5 years, as compared with one limited-acreage lease sale in each of those areas under the June 1980 schedule (p. 8). The OSE1S states that this alternative shall cause "the greatest change in probable oil spills" in the Barrow Arch and Oiapir Field (p. 29), where 47 oil spills in excess of 1,000 barrels are expected to occur (p. 26). This contrasts sharply with the estimate of about 11 oil spills of this size for these areas under the June 1980 program. FEIS, p. 146. The OSE1S also states (p. 42) that these areas are scheduled for "the greatest degree of expansion of OCS activity of all Alaska areas," resulting in "much greater" adverse impacts to sensitive areas. At the same time, the OSE1S states (pp. 46, 55) that information on ice hazards, endangered species, and socioeconomic effects in these areas will not be available when decisions on sales in these areas are made. As a result, it is clear that the proposed program poses tremendous risks to the residents of the North Slope 8orough, who live immediately adjacent to these lease sale areas.

Unfortunately, the full magnitude of the risks is not described in the OSEIS. The document contains numerous omissions and errors, as we describe below. First, however, we focus on several legal problems raised by the proposed program, which are independent of the adequacy of the analysis of that program in the OSE1S.

1. THE PROPOSED PROGRAM VIOLATES THE OCSLA

The proposed program violates the OCSLA in three respects. First, the size of the lease sales, which will include planning areas in the Oiapir Field and the 8arrow Arch covering 51 and 28 million acres respectively, is inconsistent with the requirement in Section 18(a) that the size and location of leasing activity shall be set forth "as precisely as possible." These sales cover such vast areas that planning by local governments is impossible. The proposed program therefore defeats one of the major reasons for establishing a lease schedule. In effect, it improperly delegates to the private sector the Secretary's duty in Section 18(a) to "select the timing and location of leasing."

Second, the OSE1S admits (Appendix I, p. 9), that "(s)ales have been located according to their hydrocarbon potential." However, Section 18(a)(3) of the Act requires that the timing and location of leasing activity be selected:

> "To the maximum extent practicable, so as to obtain a proper balance between the potential for environmental damage, the potential for the discovery of oil and gas, and the potential for adverse impact on the coastal zone."

8y using resource potential as the sole criterion, the proposed program fails even to attempt to reach the required balance of these three factors.

Third, the proposal substitutes a call for information for the existing call for nominations. DSEIS, p. 4 and Appendix 1, p. 2. This change is inconsistent with Section 18(f)(1) of the Act which provides that:

> The Secretary shall, by regulation, establish procedures for -
> (1) receipt and consideration of nominations for any area to be offered for lease or to be excluded from leasing* * *.

The report of the House committee on the 1977 amendments to OCSLA states (H. Rep. 590, 95th Cong., 1st Sess. 151-152 (1977)):

> The Secretary presently uses a nomination process. The committee intends that this form of industry and public participation in a leasing program be continued.

The Senate committee report contains nearly identical language. S. Rep. 284, 95th Cong., 1st Sess. 77 (1977). Therefore, Congress clearly intended the existing call for nominations process to

continue. The Oepartment cannot abandon this presale procedure.

1I. THE PROPOSEO PROGRAM V1OLATES NEPA

The proposed program contemplates that an E1S will initially be prepared for an entire planning area. OSEIS, App. 1, p. 3. "The NEPA document prepared for the second offering in an area will update the E1S for the first offering with information that has become available since the first document was written." Id. at 5.

This proposal violates NEPA in two respects. First, neither the initial nor subsequent E1Ss will consider the specific risks and benefits of leasing particular tracts within a planning area. As we explained in our May 21, 1981, comments (p. 4), several court decisions have held that the preparation of a broad, general E1S does not eliminate the need to prepare a particularized EIS which analyzes the site-specific impacts of major components of the overall action. Therefore, both the initial and subsequent EISs must contain site-specific analysis of the particular tracts being offered in each lease sale.

Second, the propsed method of preparing EISs violates the CEQ regulations. Section 1502.20 of those regulations provides that EISs can be "tiered," so that subsequent documents build upon prior ones, but that the subsequent EIS "shall concentrate on the issues specific to the subsequent action." Under the proposed program, neither the initial nor the subsequent E1S will concentrate on site-specific issues. The subsequent EIS will only contain new, generalized data. This is not tiering, but instead is an attempt to avoid NEPA requirements.

The reminder of our comments focus on the adequacy of the OSEIS.

I11. THE OSE1S FA1LS TO ANALYZE THE ENV1RONMENTAL 1MPACTS OF PROPOSALS TO STREAML1NE THE LEASING PROCESS

An integral part of the proposed program is a plan to streamline certain aspects of the leasing process. Appendix I of the OSEIS describes how the Department intends to make numerous major changes in the current leasing process, including the offering of entire planning areas in a single lease sale, the studying of entire planning areas in a single EIS, the decreased spacing of second offerings in frontier areas, the deletion of tract selection and site-specific geohazard studies, the deferral of site-specific environmental studies until the post-sale phase, and the elimination of tract specific hydrocarbon assessments by U.S.G.S. Yet the OSEIS offers virtually no analysis of the environmental

impacts of these proposals.

That analysis is clearly required under NEPA because many, if not all, of these proposals are likely to have serious environmental impacts if they are implemented. For example, the offering of entire planning areas will greatly increase the pace of OCS activity, causing an increased risk of accidents and blowouts. The recent report by the National Academy of Sciences on OCS safety (hereafter the NAS Study), which is attached to NRDC's May 22, 1981, comments on the streamlining proposals, states (p. 10):

> 8ecause of increased drilling and development activity, there has been a reduction in the experience (and possibly the skill) level of personnel involved in drilling and other well-control operations. Further expansion of leasing activity and development in older fields could exacerbate this problem. Although it is difficult to assess in a quantitative way, the committee is concerned that the risk of blowouts will increase unless the industry can compensate for inexperience, for example, through increased training. (emphasis added)

In its May 22, 1981, comments, Exxon acknowledges (p. 6) that "(t)rained manpower is always the most serious problem." Elsewhere in its report, NAS found that the historical rate of blowouts is 1 blowout for every 264 wells drilled (p. 85). Applying this ratio to the 8,802 exploratory wells and 25,523 production wells expected to be drilled under the proposed program (OSE1S, p. 22), one would expect 130 blowouts. Yet even this figure may be too low because, as NAS states, it expects the risk of blowouts to increase under an accelerated program. This problem is not analyzed in the OSEIS.

The offering of large areas may also encourage spotty, scattered development of lease tracts, because industry will seek to reserve rights to the best tracts in the total planning area. Several oil companies recognized that highly prospective tracts will always be the subject of fierce competition. Sohio, p. 5, Exxon, p. 4. The resulting "measles" pattern of development could spread environmental impacts over a much larger area, and make those impacts much more difficult to mitigate and control.

The OSEIS also fails to analyze the environmental impacts of other streamlining proposals. The study of entire planning areas in one EIS will decrease the level of detail and the amount of tract-specific analysis. The decreased spacings of sales in frontier areas will decrease the availability of data acquistion between sales. According to NOAA, the deletion of tract selection will decrease the accuracy of oil spill risk assessments and

increase the difficulty of onshore planning. NOAA May 21, 19B1, Comments, p. 2. The deletion of geohazard studies and the deferral of site-specific environmental studies until the post-sale phase will make it more difficult to develop site-specific stipulations to protect biologically sensitive or geophysically hazardous tracts. Ibid. Thus, the reslut of all these proposals will be less protection of the environment, and a greater risk of harm to sensitive biological resources. This problem is not recognized in the DSEIS.

IV. THE OSEIS FAILS TO ANALYZE THE ECONOMIC IMPACTS OF PROPOSALS TO STREAMLINE THE LEASING PROCESS

The CEQ Regulations define "effects" of a proposal to include "economic" effects. 40 C.F.R. 1508.B(b). The DSEIS devotes three sentences to the effects of the porposed program on economic resources (p. 63). The only meaningful sentence in that section is the statement that "steel products, specialized manpower and capital constitute required resources (that) may be scarcest." Ibid. This is totally inadequate.

Industry and other comments on the streamlining proposals contain abundant evidence of the serious economic effects of these proposals. At least six oil companies commented that the streamlining proposals would place a severe strain on the availability of data, equipment, manpower and capital. See comments of BP Alaska, p. 1-2; Texaco, p. 2, Exxon, p. 6; Arco, p. 12. Sohio states that "the larger offerings that are proposed are likely to impose a strain on the manpower and financial resources of most companies, especially the smaller one" (p. 7) and Marathon states that "more frequent and larger offerings would inhibit industry efforts to use economically scarce manpower and resources in the most efficient manner by simply overtaxing its capabilities" (p. 14). As a result, Marathon stated that medium-sized and smaller companies may refrain from bidding at all, leading to reduced competition on the OCS. Ibid. The oil companies similarly stated that larger offerings would spread a fixed amount of capital over a larger number of tracts, leading to reduced bids and reduced competition, and a resulting decline in the economic return to the federal government from the lease sales. Texaco, p.4; Marathon, p. 8; Sohio, p. S; Exxon, p. 3-4. Arco stated, for example, that as the total offering increases, the percentage of tracts receiving bids, the number of bidders per tract and the amount of bids will all decline. Arco comments, p.S.

Finally, NOAA commented (p. 3) that the elimination of presale U.S.G.S. geohazards studies may force the government to take the "extremely costly" option of buying back the tract after the sale if U.S.G.S. subsequently discovers that severe geohazards exist. The consequences to the public of lower bids, decreased oil industry competition, and increased government

buy-back expenditures must be analyzed in the DSEIS.

V. THE DSEIS FAILS TO ANALYZE REASONABLE ALTERNATIVES TO THE STREAMLINING PROPOSALS

As we have shown, the streamling proposals are an integral part of the proposed program and have serious environmental and economic effects aside from the effects of an increased number of lease sales in the new proposed schedule. However, in defining alternatives, the OSEISonly considers alternative schedules with different numbers and locations of lease sales. No effort has been made to develop alternatives to the streamlining proposals.

Thus, there is no analysis of intermediate offering sizes, but only a description of the differences between an area-wide offering of up to 16D million acres. It is quite possible that the optimum offering size is between 3 and 20 million acres. Indeed, 4 oil companies recommended offerings in this range. See Marathon, p. 3 (3 million acres); Arco, p. 7 (10-20 million acres); BP Alaska, p. 1 (1D million acres); Sohio, p. 4 (3 million acres).

Furthermore, there is no analysis of alternative leasing procedures. For example, NOAA has proposed the addition of a "bid commitment" step in the leasing process. NOAA Comments, pp. 4-S. Under this procedure, the leasing process could progress from the call for information, to area selection, to submission of bid commitments, to areawide environmental assessment of tracts receiving commitments, to bid acceptance for tracts receiving favorable environmental assessment, to submission of bid monies by successful bidders. According to NOAA, this procedure has several advantages over DOI's proposals, because it would increase the quality of relevant environmental information available to the decisionmakers while simultaneously reducing costs to industry.

Both of these alternatives of intermediate offering sizes and a bid commitment step are reasonable alternatives supported by expert participants in the OCS leasing program and therefore must be analyzed in the final SEIS.

VI. THE DSEIS FAILS TO CONTAIN A WORST CASE ANALYSIS OF THE IMPACTS OF THE PROPOSED PROGRAM ON ENOANAGERED WHALES

Appendix I of the DSEIS recognizes the need to prepare a worst case analysis in certain circumstances (p. S):

> Section 1SD2.22 of the NEPA regulations provides for preparing an EIS when there is

> either incomplete or unavailable information. In these instances, it is necessary for the agency to make clear that such information is lacking or that uncertainty exists. An agency preparing an EIS is these circumstances is required to include a worst case analysis and an indication of the probability or improbability of its ocurrance.

According to the analysis in the OSEIS, these circumstances apply to bowhead whales, which may be adversely affected by increased leasing activity in the Beaufort, Chukchi and Bering Seas (pp. 4S-46). The DSEIS states that additional OCS activites contained in the proposed program when added to currently planned activities, "will increase the risk of adverse effects on bowhead whales from oil pullution and human disturbance" (p. 4S). The OSEIS concludes that "the degree and significance of this is not known" (p. 4S) and that "the present schedule of activity may not allow sufficient time to collect scientific data on, (these) effects . . ." before the OCS activities occur (p. 46). This is precisely the type of situation in which a worst case analysis is required. Nevertheless, no worst case analysis has been done.

Furthermore, the failure to do a worst case analysis would be grossly inconsistent with prior government actions. First, the Department of the Interior prepared a worst case analysis on the efforts of the 1979 Beaufort Sea sale on the bowhead whale. Final EIS, Proposed Federal/State Oil and Gas Lease Sale, Beaufort Sea, August 1979, pp. 237-241. It concludes that a "plausible combination of oil spill events" could reduce the bowhead population by hald. Id. at 241. That worst case analysis assumed the occurrence of one 120,DOO barrel spill in a lease area containing about a half a million acres. Id. at 240, 4. The proposed program predicts the occurrence of 26 oil spills in excess of 10,ODO barrels along the bowhead's entire migratory route in the Diapir Field, Barrow Arch, Norton Sound, and Navarin 8asin. DSEIS, p. 26. Thus, there is even more reason to prepare a worst case analysis on the greatly increased oil spill risk under the proposed program.

Second, relying upon questionable studies the National Oceanic and Atmospheric Administration has announced to the public that "(r)ecent scientific analyses have indicated that the bowhead whale population may decline even in the absence of any further hunting (by Inupiat Natives for their subsistence)." 46 Fed. Reg. 3942 (Jan. 16, 1981); 45 Fed. Reg. 70032 (Oct. 22, 1980). NOAA has used these analyses to support reductions in the quotas of bowheads taken by Inupiats. Ibid. It would be sheer hypocrisy for the government to claim now that it has no idea whether the bowhead population may decline if that population is impacted by 26 major

oil spills.

Third, on June 24, 1980, NMFS prepared a biological opinion on the effects of the 1979 8eaufort Sea lease sale on bowhead whales. That opinion concluded (p. 1S):

> "Because of the severly depleted status of the bowhead whale population, its use of the lease sale areas, the environmental conditions in the area and the concern over the potential effects of oil and gas activities discussed above, the NMFS believes that the DOI cannot at this time insure that all oil and gas activities which may result from the lease sale are not likely to jeopardize the bowhead whale."

This statement is implicitly inconsistent with the statement in the DSEIS that the degree and significance of the impacts of an expanded schedule are unknown. At the very least, an accelerated lease sale makes it even more difficult to make a finding of no jeopardy. It also makes it even more important to perform a worst case analysis, so that the approximate magnitude of the serious risk to the bowhead is properly communicated to the decisionmaker.

VII. THE OSEIS FAILS TO ANALYZE THE SECRETARY'S TRUST RESPONSIBILITY TO INUPIAT NATIVES

In the Secretarial Issue Oocument on the June 1980 program, former Secretary Andrus acknowledged (p. 33, 47) that he had a trust responsibility to Native Alaskans which required him "to be cognizant of the needs of Native Alaskans' culture, and to protect the species necessary for subsistence purposes." The 8orough is presently litigating the sources and scope of that responsibility in its suit on the June 198D schedule. C.A.O.C., No. BO-1991, argued March 4, 1981. The Borough would like to reserve an opportunity to comment on the effects of this lawsuit on the proposed program if the Court announces its decision after the close of the comment period of the DSEIS.

Nevertheless, under even the most narrow trust responsibility standard, the DSEIS fails to pass muster. The Secretary's trust responsibility is never mentioned. Furthermore, the OSEIS does not even analyze the impacts of all the predicted reductions in subsistence resources on Inupiat culture. The OSEIS makes but passing references to the increased socioeconomic impacts of reductions of bowhead whales, caribou and fish (pp. SD, SB), without ever analyzing what those impacts will be, or whether they will significantly disrupt native subsistence patterns. Furthermore, the DSEIS completely fails to analyze reductions in other

subsistence resources, such as migratory birds, polar bears, seals, walrus, and waterfowl, even through the document admits that such reductions will occur (pp. 29, 42). As a result, the OSEIS also fails to analyze the cumulative effects of all reductions in subsistence resources on Alaskan Natives.

VII. THE OSEIS CONTAINS SEVERAL OTHER SIGNIFICANT ERRORS AND OMISSIONS

A. Risk of Oil Spills Reaching Shore

The OSEIS states on page 29 that:

> It is possible, however, that most spills in Arctic waters will not reach shore, so despite in increase in spill probabilities, their coastal impacts will now show a concommittent (sic) increase.

This statement is contradicted by statements in three other places in the OSEIS that these will be "an increased potential for oil spills reaching shore" (p. 17), a "greater possibility of oil spills coming in contact with coastline" (p. IB), and "an increased probability of oil spills reaching shore" (p. 28). Furthermore, it is inconsistent with several recent Arctic studies by scientists Gunter Weller (p. 365, attached) and O.R. Thomas (p. 95, attached).

B. Acceptance of the Present Leasing Schedule by Local Governments

The OSEIS states that the pace of leasing under the current five-year program "is well understood and accepted by coastal States and local governments * * *" (p. 23). This statement ignores the fact that the June 1980 schedule has been judicially challenged by California, Alaska, and several local governments in those states, including the North Slope Borough, and that other judicial challenges have been brought by state and local governments, including the North Slope Borough, have filed numerous comments criticizing the pace of leasing under both the June 1980 schedule and the new, proposed program.

C. Environmental Impacts of Alternative 5

The OSEIS claims that Alternative 5 (the "Alaska Alternative") would be more environmentally beneficial to Alaska than the proposed program (Alternative 1) because it "would allow for the collection of more environmental data, would permit coastal zone management plans to be completed, and would allow for more advancement in offshore operations technology in arctic and near arctic

waters" (p. vii). With respect to the Beaufort and Chuckichi Seas, this claim is totally erroneous, because the OSEIS admits elsewhere (pp. vii, 21, 24 and 65) that impacts in these areas will be the same as or similar to the impacts of Alternative 1. The pace of leasing in these two areas is practically identical for both alternatives. Therefore, as far as the North Slope 8orough is concerned, Alternative 5 is no alternative at all.

D. Usefulness of Pre-sale Site-specific Environmental Data

Appendix I to the OSEIS (p. 4) states that "recent experience has demonstrated that detailed, site-specific information is of little practical use in the pre-sale phase of the program." On the contrary, exactly this type of information was used in fashioning tract-specific lease stipulations for the 1979 Beaufort Sea lease sale (see Federal Stipulation No. 9 on 8lock 700 of Tract No. BF-40, 44 Fed. Reg. 64758, 64762). Furthermore, NOAA, the agency with the greatest expertise in developing and applying site-specific environmental information, emphasized in its May 2I, 19B1, comments (pp. 2, 4) that it is especially important to have detailed environmental information in the pre-sale phase in order to develop appropriate lease sale stipulations. The NAS report similarly recommends (p. B4) "that necessary background studies (be) completed and permit conditions established prior to the awarding of OCS permits and leases * * *."

E. Earlier Re-entry into High Potential Areas

Appendix I to the OSEIS states (p. 7) that the consideration which led the Department to establish three-year spacings between offerings in frontier areas "are now open to question." The OSEIS states, first, that "recent experience with the OCS program has provided little evidence of onshore boom - bust cycles." However, recent experience with the existing OCS program is hardly a valid criterion for predicting the impacts of the greatly accelerated pace of the proposed future OCS program. The OSEIS itself admits (p. 17) that the proposed program is a "radical departure" from the existing program. Consequently, past experience is a poor guide for the future. Furthermore, the OSEIS itself states elsewhere that boom-bust cycle will occur. To accomodate the proposed program in Alaska, "shore facilities cannot simply be expanded but must be carved from virgin coastline, and totally new pipeline systems must be constructed* *" (p. 28). The OSEIS also states that "a strain on existing economic and population infrastructures is to be expected if new OCS-related facilites are located in areas of low population and minimal existing industrial infrastructures" (p. 61). This statement clearly applies to the 8arrow Arch region where "little infrastructure exists and would have to be developed prior to production" (p. 5I).

The OSEIS next argues that "States now have more experience with OCS planning activities so that overload should not be a problem." App. I, p. 7. On the contrary, NOAA has commented (p. 2) that by deleting the tract selection process," planning for on-shore impacts will be considerably more difficult." Furthermore, the OSEIS admits (pp. 46, 55) that under the proposed program there will be inadequate time to develop adequate environmental inforamtion about pack ice conditions, socio-economic impacts, and impacts on endangered species. Moreover, the OSEIS admits (p. 51) that the cumulative transportation effects of offshore and onshore development near the Oiapir Field "could overtax existing facilites."

Finally, the OSEIS questions the assumption that three-year spacings are need to increase knowledge about operating conditions in an area and to understand the geology of the area. The OSEIS states that, with area-wide offerings, "understanding of the geology of the area leased may shed little light on that of the remaining areas available for subsequent offering." App. I, p. 7. This analysis, too, is erroneous. The three-year spacing concept is no based primarily on the need to use geologic information from prior sales. Instead, it reflects the amount of time needed to develop a working knowledge of hazardous ice condition in frontier areas, to extend technology gradually from nearshore to shear ice zones, and to acquire data within limited field seasons. Recent comments by several oil companies indicate that these concerns are still valid. Like the Borough, Marathon (p. 7) recommends three years' lead time or longer in Arctic ice areas where data acquisition is difficult. Arco (Attachment II, p. 3), BP Alaska (p. 2) and Sohio (p. 4-5) similarly echo the 8orough's concerns and recommend that sales should begin in shallow waters and then move progressively into more difficult areas.

F. Accelerated Economic Development

A major assumption underlying the OSEIS is that "since entire planning units will be offered rather than only selected tracts in or near known producing areas or high prospect areas, industry will be able to inventory planning units more completely than in the past, and all of the resources will be discovered much more quickly" (p. 16). This assumption is highly questionable.

First, as NROC has shown in its May 22, I9B1, comments (pp. 20-21), the statistics from recent lease sales shows that very large offerings are not likely to result in increased numbers of tracts leased. The oil industry focuses on a limited number of tracts regardless of the amount of acreage offered.

Second, recent comments by oil companies indicate that the

assumed increase in development will not occur. Sohio states (p. 4):

> Larger offerings would not necessarily increase the pace of exploration; environmental and capital considerations are more likely to control that; nor would they assure that the most prospective hydrocarbon areas were explored first. They would tend to dilute company effort both in manpower and capital resources resulting in tracts that were less well evaluated, with some potential prospects being overlooked. In a larger area a company's capital resources would be severely stretched resulting in a pace of exploration no more rapid than that which takes place at present in a smaller area.

Exxon likewise states (p. 3):

> We believe the overall size of the offerings will prove to be of less significance than other variables such as the quality of the prospects within the area and the technological capabilities required to operate in the area.

Marathon states (p. 8):

> The amount of areas bid on *** will be determined by (a company's) evaluative capabilities and not by the size of the offering. It cannot be expected, therefore, that increased offerings will increase the amount of acres upon which these companies bid.

In short, the OSEIS's assumption of rapid development is inconsistent with the limited resources of the oil and gas industry.

G. Chronic Oil Discharges

Although the OSEIS recognizes that chronic oil pollution and major oil spills will cause the "most serious potential impacts" to endangered species (p. 55), no effort is made to quantify the increase in chronic oil pollution cause by the proposed program. The OSEIS only analyzes accidental oil spills in excess of 1,000 barrels, and ignores intentional or routine chronic discharges. Since the NAS Study (p. 63) finds that chronic low-level discharges constitute two thirds of all oil entering the marine environment, the OSEIS cannot accurately assess th total oil amount of oil expected to enter the marine environment over the life of all the lease sale in the proposed program.

H. Availability of Fill Material

Exploratory and development platforms in the Arctic area will largely utilize artificial earth or gravel islands. NAS Study, p. 227. Construction of these islands will require extensive dredging of tremendous quantities of material. NAS estimates that a single production island may require more material than that used to build the Zuyder Zee Dike in the Netherlands. Ibid. NAS also states that large-scale dredging "will result in the suspension of a great deal of sediment in the water column," causing a smothering of benthic biota. Ibid.

Despite the enormity of these gravel requirements and the serious impacts associated with them, the DSEIS makes no mention of this issue. This omission should be corrected.

I. Consultations on Endangered Species

The DSEIS mentions (p. 55) several leasing areas which have previously had endangered species consultations concerning marine mammals. Nevertheless, it inexplicably fails to mention the prior consultation concerning bowhead whales in the Beaufort Sea. See 44 Fed. Reg. 64768 (Nov. 7, 1979). This consultation is of equal or greater importance than the consultations which are mentioned in this section, and should be added.

I appreciate the opportunity to provide these comments.

Sincerely,

NORTH SLOPE BOROUGH

Ralph Andersen

for Jacob Adams, Mayor

JA:RA/aj

ambag
ASSOCIATION OF MONTEREY BAY AREA GOVERNMENTS
MAIL ADDRESS P.O. BOX 190 MONTEREY CALIFORNIA 93940 • TELEPHONE (408) 624-2117
OFFICE LOCATION 23845 HOLMAN HIGHWAY SUITE 227

September 16, 1981

Mr. Frank Gregg
Director
8ureau of Land Management (542)
Oepartment of the Interior
18th and C Streets, N.W.
Washington, D.C. 2D240

Oear Sir:

We have reviewed the Draft Supplement to the Final Environmental Statement (OSFES) for the Proposed Five-Year OCS Oil and Gas Lease sale schedule and would like to submit the following comments for your serious consideration.

We would first like to comment on the deadline included in the OSFES of July 27, 19B1 for submitting comments. We did not receive the document until calling to request it from the Pacific office of BLM, although we should have as a matter of course. 8y the time it arrived, the deadline was already past and even had we obtained the document two weeks earlier, the length of the comment period would have been totally inadequate. The significance of the DSFES to the future of offshore leasing alone warrants a review period of at least 9D days. Obviously, opportunity for input has been minimized if not virtually eliminated.

Contradictory to the date noted in the OSFES, it was stated in the DOI press release of July 15, 19B1 (Proposed Five-Year Offshore Leasing Program Announced) that the proposed program "will be published in the Federal Register ... (and) (i)nterested parties will be given 9O days to comment on the proposal". We can only assume that although the 197B amendments require this comparatively lengthy review period, that 8LM has essentially finalized the schedule without the benefit of agency or public input.

In light of the unreasonable nature of the July 27 deadline and our grave concern over the contents of the document, we would hope that our comments will not be disregarded.

The basic intent of the proposed schedule revision is very clear; to speed up the rate at which offshore lands are leased, explored and oil and gas extracted, and to open up virtually all offshore lands to the oil industry several times over a five year period with the goal of reducing our dependence on foreign oil. There is no question that increased energy independence is greatly desirable. It is equally clear that the proposed changes, if effectuated, will be made at the expense of local, state and public participation, the environment, and coastal economies. The proposed program is completely contrary to the state and local recommendations for amending the

Member Agencies Counties of Monterey and Santa Cruz, Cities of Capitola, Carmel, Del Rey Oaks, Gonzales, Greenfield, King City, Marina, Monterey, Salinas, Sand City, Santa Cruz, Scotts Valley, Seaside, Soledad, Watsonville Associate Member, Fort Ord

federal leasing process as have been expressed at every opportunity in Lease Sale 53. In fact, the OSFES is the absolute antithesis of the program we would find acceptable.

A few examples of these differences are:

Requested by State and Local Government	Proposed in OSFES
1. Separate EISs for each distinct basin within a lease sale area - to allow a more complete analysis of environmental and economic impacts vs. resource potential.	1. "Tiering" of EISs. The first EIS for an entire planning unit under this new system, effective January, 1982 (for example, "California") will incorporate reconnaisance rather than area specific information only; EISs for subsequent offerings in an area will consist of a short update of the first EIS.
2. Site-specific environmental studies should be completed prior to preparation of an EIS where significant resource conflicts have been identified.	2. No site-specific environmental studies or tract-specific hydrocarbon assessments to be conducted before leasing of tracts.
3. More time for EIS preparation; increased role for state/local governments (including joint EIS preparation.)	3. Compressed schedule; severe decrease in opportunity for local/state government and public input. For example, substituting the current call for nomination tract selection process with a unit-wide call for information.

As is consistent with our actions over the 1D years that we have actively participated in the offshore leasing program, we are wholly opposed to the revisions to the Five Year Schedule. We hold to our belief that offshore lands can be developed in a reasonable manner and rate which neither imposes lasting damage to coastal resources nor excludes citizens, state and local governments from active participation.

There is little value in listing the specific elements of the document that we find unacceptable as they are all direct byproducts of the accelerated and expanded leasing program. But, if we had to single out any particular changes, they would be the offering of entire planning units versus tracts selected following a call for nominations (in our case, offshore the entire state of California) and the elimination of area-specific information from the EIS.

We also concur with those comments submitted by the California Coastal Commission,

especially the following points:

- The proposed program includes leasing areas that are totally inconsistent with the federally approved California Coastal Management Program, specifically with respect to the inclusion of the Northern and Central California frontier areas.
- Conflicts of intensified OCS development with the proposed Monterey 8ay Marine Sanctuary are inherent in the OSFES, and have not been adequately addressed.
- The cumulative impacts of an accelerated leasing program encompassing the entire California outer continental shelf have not been evaluated; it is readily apparent that the potential magnitude of these impacts is enormous.
- The proposed accelerated and "streamlined" schedule poses an unacceptable burden on local and state governments to anticipate and mitigate associated impacts on the coastal environment and economy.

It appears that under the preferred alternative (#1), all of California would be offered for lease in 4 consecutive years. While still totally unacceptable, alternative #4 (#73 - All California, #BO - Central and Northern California, #91 - Southern California, #95 - Central and Northern California) would be preferable to alternative #1. The burden upon local/state agencies in anticipating and designing measures to mitigate adverse impacts resulting from sales under alternative #4 would be relatively less.

We are hopeful that you will reconsider your proposal in view of the comments that you receive. If not, then the intent of the OCS Lands Act Amendment of 1978 will surely have been disregarded.

Sincerely,

D. Dan Forbus

D. Oan Forbus
President

DOF:vbd

cc: Secretary James Watt, Oepartment of the Interior
The Honorable Alan Cranston
The Honorable S.I. Hayakawa
The Honorable Leon Panetta
The Honorable Henry Mello
The Honorable Sam Farr
The Honorable Carol Hallett
William Grant, Pacific Office 8LM
Coastal Commission

Department of Environmental Management
Planning and Development Division

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PLANNING DIRECTOR

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July 22, 1981

B:11

Director
Bureau of Land Management
Department of the Interior
18th and C Streets, N.W.
Washington, D.C. 2024D

Dear Sir:

San Mateo County Department of Environmental Management, Planning Division, has reviewed the Draft Supplement to the Final Environmental Statement, Proposed OCS Oil and Gas Lease Sale Schedule, January 1982 - December 1986. We submit the following general and specific comments.

GENERAL COMMENTS

Document Approach

The Draft Supplement to the FES is as the other environmental documents on OCS, a justification document. An Environmental Impact Statement should be a disclosure document to guide the decision maker. Instead, BLM has produced a document which, in tone, attempts to justify the program. There are many admitted unknowns concerning impacts followed by conclusions that the impacts will be insignificant. Such statements in the Impact discussion as "impacts will be substantial" are negated or dilluted in the Conclusion discussion with such qualifiers as "possibly" or "insignificant". These statements are unjustified and are, therefore, obviously intended to obviate the impacts.

Balancing Required Under Section 18 of the OCS Lands Act Amendments

San Mateo County does not believe that Congress intended that the DOI interpret the OCS Lands Act in a manner which pays little heed to the risks to local economies and the environmental resources of the regions involved in OCS Lease Sale activities. It is the County's opinion that Congress intended that a balance should be achieved between local economic and environmental risks and the developmental benefits of oil resources, and that DOI was to use the size, timing and location of lease sales to achieve this balance. The five-year schedule maximizes oil production and minimizes attention given to local environmental risk.

Size, Timing and Location

San Mateo County has serious objection to the streamlining process of OCS activity. Regarding size and location, the Five-Year Schedule identifies four

California sales, an area representing nearly 90 million acres and one thousand miles of Coastline. This does not, as required by Section 18, define the Sale "as precisely as possible". San Mateo County continues to support basin by basin analysis and disagrees with the statement that the area is composed of "similar environmental features suitable for analysis in a single EIS" (page 2, Appendix 1).

With respect to timing, the schedule neither gives DOI time for adequate study, nor local governments time to manage and mitigate the effects of OCS development. This is particularly true in light of elimination of Coastal Energy Impact Program funding. Further, changes in the schedule which eliminate tract selection in favor of area selection does not allow precise study of specific environmental and economic consequences and thus, severely limits the Secretary's duty to strike a proper balance.

Fair Share Alternative

In October of 1979, San Mateo County commented on the Five Year Leasing Schedule and at that time expressed concern over the interpretation of Section 18 of the OCS Lands Act. Two years later, our concern is even stronger. Five sales in five years does not represent an "equitable sharing of developmental benefits and environmental risks". The 1980 Five-Year Lease Sale Schedule appears tame by comparision. The Draft Supplement FEIS of the Five-Year Leasing Schedule was developed to "help meet the Administration's goal of increasing our domestic supply of energy in an environmentally sound manner." San Mateo County and other coastal counties have offered this Administration an alternate approach. In June of 1981, the San Mateo County Board of Supervisors adopted a resolution establishing an energy equivalency policy for the County. Through a responsible program of conservation energy production in San Mateo County, residents can equal our fair share of the net energy production of gas and oil in the Santa Cruz Basin. This positive action on our behalf will not only result in the protection of our local economic, environmental and recreational resources, but will, at the same time reduce our local dependence on national energy production and demands. Furthermore, by not extracting oil and gas from the Santa Cruz Basin at this time, it remains available for any future legitimate national emergencies.

SPECIFIC COMMENTS

Page 23, First Paragraph - States that until large amounts of hydrocarbons are produced in Northern and Central California, tankers will be used for oil and gas will be reinjected. This is in conflict with later statements (p. 24,31) which imply pipeline transportation only. Impacts of tanker and pipeline should be discussed.

Page 29, Fourth Paragraph - The discussion of impacts of oil spills on coastal ecosystems should not be glossed over. Given basin locations and resource estimates, BLM can estimate where leasing is most likely to occur, where spills are likely to occur and the ecosystems that will potentially be affected. If BLM does not know, how can the conclusion be derived in page 25, that impacts will be low to moderate.

Page 31, Last Paragraph, Conclusion - Discussion of impacts on shipping and navigation neglects to consider tanker traffic in Northern and Central California until enough oil justfies pipeline (p. 23).

Page 32, Fifth Paragraph - To conclude that present facilities in the lower 48 states "should be sufficient except possibly" is typical of the inadequate conclusions of this document. Frontier areas will not have sufficient facilities.

Page 36, Last Paragraph - Industry constructed and located support facilities and docks is a land use problem as well as a conflict with commercial fishing activities.

Page 40, Northern California - Why can't predictions from Lease Sale #53 be used. See comment about page 29.

Page 45, Southern California, Northern and Central California - The discussion regarding endangered species should include more detail about the southern sea otter and its habitat in relation to the high interest Santa Maria Basin.

Page 47, California - As opposed to other regions of the County in California, the recreation season is long, access to the ocean is good and an oil spill any time of the year would disrupt visitor use.

Page 47, Last Paragraph - It is erroneous to conclude that air quality effects will not constitute a serious impact. The fact of the matter is that the recently adopted Air Quality Regulations are not adequate to protect on-shore air quality from OCS operations. In California, some non-attainment areas may become worse and other areas may become non-attainment. The 1980 FES concludes on page 274 that exploration and development activities may affect on-shore air quality.

Page 51 - Discussion of socio-economic impacts on California is missing.

Page 52, Coastal Zone Management - This should include a discussion of budget cuts to local governments for planning and mitigating impacts of OCS development.

Page 53, California - This should include a discussion of the proposed removal of the hydrocarbon ban from marine sanctuaries.

Page 58, Recreation - "The degredation of the aesthetic environment conducive to recreation" cannot be mitigated through site selection when dealing with a platform, unless it is beyond the line of sight.

Page 59, Air Quality - See comment concerning page 47.

Page 60, Relationship between short-term . . . - It is appropirate to consider that endangered species, which are threatened by habitat change, are particularly susceptible to oil spill and, therefore, could be eliminated. The result would be a long-term loss.

Sincerely,

David C. Hale, Planning Director
San Mateo County

BOARD OF SUPERVISORS
(408) 425-2201

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COUNTY OF SANTA CRUZ

701 OCEAN STREET SANTA CRUZ, CALIFORNIA 95060

DAN FORBUS (FIRST DISTRICT) ROBLEY LEVY (SECOND DISTRICT) GARY A. PATTON (THIRD DISTRICT) E. WAYNE MOORE JR. (FOURTH DISTRICT) JOE CUCCHIARA (FIFTH DISTRICT)

To 6/30/22

October 1, 1981

Mr. Frank Gregg, Director
Bureau of Land Management
Department of the Interior
18th and C Streets, N.W.
Washington, DC 20240

RE: FIVE-YEAR OCS OIL AND GAS LEASE SALE SCHEDULE

Dear Mr. Gregg:

Attached is a letter dated September 16, 1981, mailed to you by the Association of Monterey Bay Area Governments. As Chairperson of our Board of Supervisors, I have been directed by the unanimously adopted order of the Board to write you a letter concurring in the letter sent to you by AMBAG. Our Board, and the people of this County, are extremely distressed that the Bureau of Land Management, and the Department of Interior, apparently intend to speed up the five-year OCS lease sale process to the extent that a thoughtful and competent consideration of the effect that OCS development could have on our local economy, and our environment, will be virtually impossible to ascertain.

The comments that AMBAG has made are to the point. Our Board wholly endorses them. We urge that you and Secretary of Interior Watt heed these comments, in considering any changes which you might propose to the present OCS Five-Year Lease Schedule.

Very truly yours,

GARY A. PATTON, Chairperson
Board of Supervisors

GAP:lw

cc: Congressman Leon Panetta
Senator S.I. Hayakawa
Senator Alan Cranston
Office of Planning and Research
Clerk of the Board

Tanana Chiefs Conference, Inc.

Doyon Building
201 First Avenue
Fairbanks, Alaska 99701
Phone (907) 452-8251

July 31, 1981

Ms. Esther Wunnicke
Manager
Alaska Outer Continental Shelf Office
U.S. Bureau of Land Management
P.O. Box 1159
Anchorage, Alaska 99510

RE: Five-year OCS Schedule Hearing

Dear Ms. Wunnicke:

The Tanana Chiefs Conference wishes to present views for the official record of the recently held public hearing concerning the five-year OCS schedule.

The Tanana Chiefs Conference region is landlocked. Therefore, we are not nearly as active as other coastal regions may be concerning the OCS program. Nevertheless, we have great concern for the proposed sales which could adversely impact the migrating adult and smolt salmon entering - and later leaving - the mouths of the Yukon River and of the Kuskokwim River.

These areas - part of the Norton Basin and Kuskokwim Bay - commonly feature severe storms and powerful tidal surges with very powerful ice movements during winter and spring months. Oil spills within the area of movement of salmon into and from the mouth of these rivers would undoubtedly damage the very important fisheries resource of our region on the interior drainages of the Yukon and Kuskokwim Rivers.

In turn, the economy of almost every community in the Tanana Chiefs region would be adversely - perhaps severely - affected. Subsistence fishing provides a basic part of the economy and diet of nearly every village in our region, and the commercial fishery is also important to a substantial number of communities and individuals within our region as well.

The Executive Board of the Tanana Chiefs Conference in May at a meeting in Holy Cross did vote to "strongly oppose" ocean leasing of oil and gas tracts which will impact migrating salmon leaving the Bering Sea and entering the Interior Alaska river systems. This activity sustains a major component of the economy of our village communities.

JOBS2h1

We are asking you to delete in the revised five-year OCS schedule any tracts which could adversely affect salmon migrating into the Kuskokwim and Yukon Rivers.

To illustrate our concerns we are enclosing several documents which have been generated within our region in opposition to a State of Alaska oil and gas lease sale #38 proposed for the mouth of the Yukon River: a resolution from the Yukon Flats subregion of the Tanana Chiefs Conference; a letter to the State of Alaska Department of Minerals and Energy Management; and a resolution from the GASH Fish and Game Advisory Committee. Each spell out the concern for the impacts of oil and gas development upon fish in the Bering Sea, and why this concern is so strong. Although these statements are not aimed specifically at your EIS for federal OCS leasing, we ask that these documents with this letter be made a part of your official hearing record so that our concerns can be made known. The statements provide a background for concern for the subsistence and commercial fisheries economy which is so important to us, and outline threats to the fisheries from activity associated with ocean drilling and oil production.

Sincerely,

TANANA CHIEFS CONFERENCE, INC.

William C. "Spud" Williams
President

WCW/JK:3243n
enc.
cc: The Honorable Ted Stevens
The Honorable Jay S. Hammond

JOBS2h2

CITY OF UNALASKA
PO BOX 69
UNALASKA ALASKA 99685
581-1251
"Capital of the Aleutians"

July 17, 1981

Director
Bureau of Land Management (542)
Department of the Interior
18th and C Streets, NW
Washington, D.C. 20240

RE: FIVE-YEAR OCS SCHEDULE DRAFT SUPPLEMENT

Sir:

I have received and reviewed the Draft Supplement to the Final Environmental Statement for the Proposed Five-Year OCS Oil and Gas Lease Sale Schedule and have several comments relative to proposed operations in Alaska, particularly the St. George Basin, and the North Aleutian Basin.

Future Environmental Reviews: On pages 32 and 38, future environmental statements are referenced; but it is my understanding from discussions with Alaska OCS Office staff that it is possible that the present document could be the last opportunity for public review and comment prior to lease sales and the beginning of operations if the Secretary were to find that additional environmental statements were not necessary. I hope it is the intention of the Department to undertake environmental statements prior to lease sales.

Economic Effect of Oil Spills: The discussion on page 38 does not address the effect of a "catastrophic" oil spill. Granted that probability may be small, it is still not zero and it is therefore significant. There is a simple test which can be applied which is to estimate the maximum economic damage which might be incurred by a large oil spill and then to determine the annual actuarial premium necessary to cover the possibility. That would provide a present worth figure which would enable comparisons between lease areas.

On page 56, the Fishermen's Contingency Fund is stated to provide for losses which "cannot be attributed to a financially responsible party." Apparently third-party claims are not covered (for example processing companies which receive less product as a result of OCS accidents or municipalities which, therefore, receive less tax revenue). Therefore, in the event of a spill of unknown origin which depressed the renewable resource industry, no protection is provided. In addition, the exclusion of "financially-responsible parties" means that to recover non-trivial damages from an oil industry operator, fishermen or third-party claimants would be in the position of having to sue oil industry operators to recover direct and consequential damages. This could be a rather heavy burden on local industry, governments and other parties because of the

disparity between our resources and those of potential legal adversaries. If the risk is truly low, there seems no good reason why it cannot be shared more equitably between the affected areas on the one hand and the United States and industry on the other. If the risk is truly low, then the cost of an indemnification fund to insure local economies (not just the fishermen) should be low, also.

Impacts on Shipping and Navigation: To say that "due to the size of Alaska planning units, the increase in oil field related traffic and structures due to the adoption of this alternative would not be significant" is naive; the signficence will depend on where the resource activities take place relative to existing shipping lanes and fisheries traffic.

Impacts on Land Use: To say that "the total level of impacts in Alaska would be low due to the relatively small number of bases needed" is to adopt a philosophy of impact assessment which could dismiss virtually any environmental impact on the basis that in the cosmic scheme of things any activity in a small out-of-the-way system makes little difference or that the effects 50 million years from now will not be discernible. An OCS support base located in our community would make for a high level of impact.

Impacts on Socioeconomic System: On page 50, the Statement refers to our community as "Dutch Harbor;" this is incorrect, the name of the community is Unalaska--"Dutch Harbor" is a body of water. Location of a facility at Chernofski or Makushin Bay is unfounded speculation. There is no evidence that any potential operator is considering location of a facility at any other place than Unalaska. On page 49, there is created a false impression that the Native peoples of the Aleutian Islands are Yupik Eskimo in origin. They are Aleut.

Alternative 5: This alternative is the only alternative which would provide the City of Unalaska a viable opportunity to prepare for the advent of OCS activities while at the same time building for a economic future which depends on the exploitation of the Bering Sea fishery for both traditional and finfish species. It is going to be very difficult for fisheries-related industry to compete for scarce resources of land, housing, skilled labor and public services locally. If that competition begins in January of 1983, there can be little doubt of the outcome; four years later, local infrastructure and economic conditions may be in a position to make an attempt to cope.

The future has been arriving very quickly in Unalaska during the past several years. In 1975, the port was not listed in national statistics. Today we are the leading US port in value-landed terms. In 1975, the municipal budget was a half million dollars; this year our operating and capital budgets will approach $15 million. During the 70's our official census

population increased by 240%. We are having a difficult time, as you may perhaps appreciate, in keeping up with the growth we have already experienced. We are in a poor position to handle a large influx of exploration and construction activity that may follow the lease.

I urge the selection of Alternative 5; the resource will still be there for later exploration and, indeed, will have increased in value.

Sincerely,

CITY OF UNALASKA PLANNING DEPARTMENT

Richard Careaga
Director of Planning

RESOURCE MANAGEMENT AGENCY

county of ventura

Victor R. Husbands
Agency Director

August 7, 1981

Director
Bureau of Land Management (542)
Department of Interior
18th & "C" Streets, N.W.
Washington, D.C. 20240

Subject: Comments on the Draft Supplement to the Final Environmental Statement, Proposed Five Year OCS Oil and Gas Leasa Sale Schedule, January 1982 -December 1986.

Dear Sir:

Ventura County would like to take this opportunity to provide these written comments on the above mentionad document. After reviewing the subject documant and attending a recently held public hearing, our offica has concerns that environmental statements producad on such extensive areas will have to be so general that detailad, effective comments will ba difficult, if not impossible.

Ventura County also requests the Department of Interior make certain that any accalerated lease sala pace not cause local governments to excaed (directly or indirectly) air quality emission standards or population forecasts mandated by state and federal regulations. The Draft Supplement and FEIS imply that implementation of the Department of Interior's OCS air quality regulations will mitigate any potential adverse impact. However, the State of California and various local agencies hava expressed concern regarding the adequacy of these regulations. The Draft Supplement should directly address the issue of whether the regulations will be adaquata to mitigate potential adverse air quality impacts in nonattainment areas, such as Ventura County.

Furthar, we support streamlining of the leasing process where duplications exist, and highly recommand cumulatively assessing impacts whereby prior existing active leases be considered in the latest laase sale EIS document.

Again, we appreciate the opportunity to provide you with these comments.

Sincerely,

RESOURCE MANAGEMENT AGENCY

for Victor R. Husbands, Director

VRH:dP40s

800 South Victoria Avenue, Ventura, CA 93009

CITY OF
UNALAKLEET

BOX 28
UNALAKLEET, ALASKA
99684
(907) 624-3531

August 7, 1981

Alaska Outer Continental Shelf Office
Bureau of Land Management
P.O. Box 1159
620 East 10th. Avenue
Anchorage, Alaska 99510

Dear Sirs:

After much consideration and planning the City Council of Unalakleet is supporting the stance the Unalakleet Native Corporation came up with on urging the Adoption of Alternative #3, i.e. "No Action", or adherence to the present schedule of no lease sales, except #57 is the Norton Sound region in the next five years. Our reasons are very similar to the Unakaleet Native Corporations, since the City do serve the same group of people, except the City serves all the residents of Unalakleet.

The City Council feels the oral and written statements the Unalakleet Native Corporation did was excellent and serves the purpose for all of our thoughts.

Sincerely,

CITY OF UNALAKLEET
Herbert Ivanoff, Admin./Tres.

HI/hp

COMMENTS FROM INDUSTRY AND PUBLIC INTEREST GROUPS

Sierra Club -

National Coastal Committee
1414 Hilltop Drive, Tallahassee FL 32303

July 19, 1981

Office of the Governor
Office of Planning & Budgeting
Re: OCS Policy Responses
The Capitol, Tallahassee FL

RECEIVED
JUL 21 1981

Dear Ms. Blizzard:

In response to your request for comment on the Draft Supplement to the Proposed Five-Year lease Sale Schedule, I am enclosing a complete list of the Sierra Club's positions on the proposed five-year schedule.

The Sierra Club strongly objects to both the schedule changes and to the proposed streamlining of the research and decision-making process:

* The program ignores the statutory requirement that a leasing program be properly balanced between resource development and environmental protection;

* Crucial environmental information will not be available to be factored into leasing decisions;

* The schedule accelerates and increases the size of sales in the nation's most ecologically valuable and fishery-rich regions, including Bristol Basin and the Georges Bank;

* The leasing program designates huge planning areas, consisting of up to 100 million acres each, for lease, thus precluding effective planning by coastal states and localities and also defeating the basic purpose of having a leasing program;

* Allowing only two years between first and second sales in frontier areas does not provide adequate time for interpreting the geological information and effects of initial OCS exploration before the next sale is held;

* Opening up 1 billion acres of the OCS within the next 5 years (1982-1986) endangers the ability of industry and the Interior Department to ensure safe operations;

* This proposal to vastly accelerate leasing is made at the same time that the Administration proposes total elimination of federal funding for the only program to assist states in mitigating the impacts from OCS development (the Coastal Zone Management Program);

* Several oil companies have said they cannot adequately prepare for such an accelerated leasing program.

* Information from previous sales indicates that increased sale size does not necessarily mean increased production from the OCS;

* Elimination of tract selection precludes DOI from obtaining tract-specific geological and biological information, and thus precludes the identification and deletion of tracts which are especially sensitive ecologically or hazardous geologically;

* Increased sale size, an accelerated schedule, and reduced funding for the OCS Environmental Studies Program, combine to preclude Interior's ability to collect essential environmental data for frontier sales prior to the decision to lease;

* The elimination of tract evaluation precludes DOI from ensuring that fair market value is obtained for leased tracts;

* The proposal to prepare an Environmental Impact Statement on an entire planning area rather than on the specific tracts likely to be leased prevents meaningful assessment of the adverse effects of particular lease sales and violates NEPA's requirements.

In summary, this Draft Schedule is a totally disorderly proposal to lease, not at the current rate of 15 million acres per year, but to offer nearly the entire OCS- one billion acres- in five years. The abdication by the government of any role in judging the suitability of each area for devleopment, the belief by many oil companies that competition will decrease, and the closing off of the state and local governments from making preparations for impacts to their coastlines ..... along with the virtual stop to meaningful scientific studies to allow more enlightened decisionmaking, all these make the OCS Development Program into a farce in this proposed plan.

Thank you for the opportunity to offer these comments.

Sincerely,

Shirley Taylor

Shirley Taylor, State OCS Advisory Committee

Chair, National Coastal Committee, Sierra Club

PS- I enclose for your information an analysis of the economic consequences of altering the leasing process.

To Libby

The Sanibel-Captiva Conservation Foundation, Inc. Post Office Drawer S, Sanibel, Florida 33957
Offices in Conservation Center, 3333 Sanibel-Captiva Road. Telephone: (813) 472-2329

RECEIVED
JUL 22 1981

July 20, 1981

Mr. Walter Kolb
Senior Governmental Analyst
Office of the Governor
The Capitol
Tallahassee, FL 32301

Dear Mr. Kolb:

We have only made a cursory review of the latest draft supplement to the Final EIS for the forthcoming BLM five-year oil leasing program. Hence we will have to rely on your more studious review and recommendations. Needless to say, we will support all of them.

Two aspects of the draft concern me. One is the "rush, rush, rush" with which it has been done. In the so-called streamlining process, I sense a tendency to take unwarranted short cuts and to elimiate or play down vital and necessary EIS's. Also, I regret to see the transfer from a government agency to the oil company lessee of the responsibility for specific geohazard studies.

Overall we have a grave suspicion that the interests of the people and the economy of Southwest Florida are going to suffer from the proposed leasing of the new areas of the Gulf Coast.

Sincerely yours,

George C. Tenney

George C. Tenney
Chairman

GCT:ca

cc: John Weinzettle

Natural Resources Defense Council, Inc.

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Board Secretary/Treasurer
John H. Adams
Executive Director

COMMENTS

OF THE

NATURAL RESOURCES DEFENSE COUNCIL

ON THE

DRAFT SUPPLEMENT

TO THE

FINAL ENVIRONMENTAL STATEMENT

ON THE

PROPOSED FIVE-YEAR OCS

OIL AND GAS LEASE SALE SCHEDULE

Submitted by:

Frances Beinecke
Sarah Chasis
Alita Charo
Janice Silverstein

Natural Resources Defense Council
122 East 42nd Street
New York, New York 10017

August 10, 1981

Printed on Recycled Paper

The Natural Resources Defense Council (NRDC) submits the following comments on the Draft Supplement to the Final Environmental Statement (DSES) on the Five Year OCS Leasing Program. We believe that the DSES is seriously deficient because of its failure to assess the full consequences of the April 1981 Draft Proposed Five Year Program and alternativcs which would have less adverse environmental impact.

NRDC's major areas of concern are as follows:

--The DSES fails to detail the potential environmental effects of the streamlining proposals and ignores alternatives to these proposals which would have less environmental impact;

--The DSES fails to adequately analyze the effects of the proposed schedule and reasonable alternatives to it;

--The DSES fails to analyze the impacts of the proposed changes in planning areas boundaries;

--The assumptions on which the impact assessment of Alternative I is based are erroneous;

--The DSES fails to discuss mitigation techniques which will be employed under the new program;

--The DSES fails to address §18 considerations.

NRDC does not comment here on the contents of the program approved by Secretary Watt on July 24, 1981. We will comment on this prior to the October 22 deadline. We do object to the issuance of his proposal prior to the Secretary's consideration of comments received on the DSES.

1. The DSES Fails to Detail the Potential Environmental Effects of the Streamlining Proposals and Ignores Alternatives to These Elements of the Program Which Would Have Less Environmental Impact

The DSES is seriously deficient because it does not assess the effects of the streamlining elements of the Draft Program. The DSES focuses almost exclusively on the effects of the schedule changes and alternatives thereto. However, to properly analyze the full scope of the draft program, it is essential that the potential effects of streamlining procedures and alternatives to these procedures be carefully analyzed.

Appendix 1 to the DSES outlines the "streamlined" pre-leasing procedures and "tiered" EIS preparation envisaged by Interior as essential parts of the draft program. No discussion of the relative merits of these changes, their environmental consequences or possible alternatives for accomplishing Interior's goals, is presented in the DSES. These changes, however, will have a tangible impact on the environment: geohazard and oil spill risk assessments will be less reliable, lease stipulations less

meaningful, coordination with state and local onshore planners less likely, and tract deletion for environmental protection less effective. Because of these potential impacts and because these elements of the draft program represent such a radical departure from existing policies and procedures of the Department, they require careful analysis in the SES. Failure to analyze "streamlining" and "tiering" violates the letter and spirit of NEPA.

The key to "streamlining" the leasing process is the proposal to switch from offering specific groups of tracts to offering entire planning areas--7 off the continental U.S. and 15 off Alaska--ranging from 9 to 160 million acres, and averaging 52 million acres. In order to accomplish this goal of offering vastly increased acreage for lease, Interior proposes eliminating a number of existing steps in the pre-lease sale process. These include elimination of: tract selection; the collection of site-specific environmental, hydrocarbon, and geohazards data; the preparation of a site-specific EIS prior to the lease sale. The streamlined procedures thus will eliminate the development and utilization of site-specific information in the pre-lease sale stage.

The potential consequences of the streamling procedures include the following:

a. Oil Spill Risk Assessments

The accuracy of oil spill risk assessment depends in part

on the use of potential lease tracts as "launch sites" for hypothetical oil spills. Without tract selection, modelling would be based on random locations within the OCS planning area. Such an increase in the uncertainty of environmental damage due to leasing makes impossible an objective assessment of the potential benefits and costs of leasing any particular tract. See NOAA May 21, 1981 Comments, p. 2.

b. Onshore Planning

Without pre-lease tract selection, coastal states cannot predict whether any tracts along their coasts will actually be leased, and if so, whether the leases will be in contiguous blocks or scattered along their entire coastline. Thus, coastal state planning is delayed until after the leases have been sold. Not only does this result in an 18-month delay before additional expenditures or legislation concerning coastal management may be initiated, but it also places an undue burden upon states wishing to participate in Interior's pre-lease planning. With pre-lease tract selection, coastal states can concentrate their resources on analyzing the potential impacts on discrete areas of ocean and coastline. With its entire OCS for lease, states will now be forced to do a much more ambitious study to effectively generate sufficient information to challenge or approve Interior's proposed notice of sale. It is not at all certain the states are capable of taking on a task of this size. In sum, federal, state and local coordination to protect sensitive areas and develop beneficial

areas will be effectively eliminated. See NOAA Comments, p. 2.

c. Lease Sale Stipulations and Tract Deletion

Lease sale stipulations are intended to supplement the more general OCS operating orders and provide specific regulatory controls to protect the environment and ensure the safety of offshore oil and gas operations. Interior's "streamlined" procedures effectively preclude serious acquisition of site-specific information prior to leasing and so eliminate lease stipulations as an important environmental safeguard. The lack of site-specific information also precludes effective use of tract deletion as a means of avoiding leasing unusually sensitive or biologically valuable areas.

The end result will be the leasing of tracts which may well have to be bought back by the government at a later stage because operations threaten important renewable resources or else the leasing of tracts on which operations may have to be severely curtailed at some later stage. Such a result serves neither the public nor industry's interests.

The NAS Study "Safety and Offshore Oil" (April 1981) concluded it is desirable to know as much as possible about potential environmental impacts and regulatory conditions to be imposed to mitigate these impacts prior to the lease sale. The Report states (page 76):

"Often the application of variation (in regulatory

> requirements) hinges on post lease sale or post-permit surveys or studies, rather than on identification of the special needs, including studies of intentional effects, before the sale or permit issuance. By structuring flexibility as a post-sale or post-permit process, the regulations introduce uncertainty into the operations and the conditions imposed on them. This creates a difficult planning environment for the companies and for those concerned with potential pollution. It may mean that damage will already have occured before conditions are imposed. It may also create an agency disincentive for adjusting the regulations post-sale or post-permit." (Emphasis supplied.)

It was for this reason that the NAS Report recommended that (page 84):

> "Government regulation should be made more predictable by providing that necessary background studies are completed and permit conditions established prior to the awarding of OCS permits and leases..."

The DSES must analyze the consequences of the streamlining procedures which run directly contrary to this important recommendation.

d. Geohazards

Without pre-leasing tract studies, USGS will be forced to assess geohazards from post-sale industry studies. The USGS will recommend lease cancellation if geohazards are so severe that oil and gas operations are unsafe from any location within the tract. This will be quite expensive if the government is forced to buy back the tract for the value of the oil and gas located there. For tracts where geohazards are significant but not insurmountable, industry resource commitment might well lead to a decision to continue use of the tract rather than the

deletion which would likely occur under current procedures. Thus, marginally safe tracts which today would be eliminated from industry consideration might well be developed under "streamlining." The resulting increased risk of injury and environmental damage is a direct result of these procedural changes. See NOAA Comments, p. 3.

e. "Tiering" of Environmental Impact Statements

While true tiering of EIS's would be a legitimate, time-saving device for the OCS leasing program, the procedures presented in Appendix 1 are merely an effort to make an end run which is designed to skirt NEPA. Not only is this pseudo-tiering in violation of NEPA's explicit and implicit mandates (see NRDC May 22, 1981 Comments, Part III), it also has significant practical effects. First, while ostensibly providing the environmental data crucial to agency decision-making, it in fact prevents site-specific consideration via use of a "regional approach" at all times prior to leasing. This overlooks the fact that each lease sale is in itself a "major federal action" requiring site-specific environmental consideration (see Natural Resources Defense Council v. Morton, 388 F. Supp. 829 (D.D.C. 1974), aff'd mem., 527 F.2d 1386 (D.C. Cir. 1976), cert. denied, 427 U.S. 913 (1976)) (programmatic statement insufficient to provide sufficiently detailed assessment of impact of individual grazing permits). Because of the "regional approach," tracts which present unusual environmental hazards cannot be

identified for deletion prior to sale. In addition, the absence of tract-specific hydrocarbon estimates precludes objective balancing of economic gain and environmental hazard--the explicit goal of both NEPA and OCSLA. Without prior identification of tracts, local and state planners are unable to focus their efforts to produce meaningful input for the Secretary's task of designing a planning area for leasing. Interested members of the public are put to a similar disadvantage. The abstract result of this process is inherently flawed decision-making by Interior. The practical result will be inclusion of tracts which are marginally valuable and/or acceptably hazardous. The ultimate impact will be a move from pre-sale tract deletion and imposition of lease stipulations to post-sale risk mitigation techniques as the primary method of environmental protection. As the NAS study, cited above, points out, such an approach is highly undesirable.

In summary, the result of the streamlining proposal will be less protection of the environment and greater risk of harm to important biological resources. These significant consequences have all but been ignored in the DSES. So too have alternatives to these proposals which would have less potential adverse impacts. NRDC requests that the FSEIS consider alternatives to the streamlining procedures (other than the status quo) which include the following:

A. Retain tract selection and pre-lease site-specific data collection but revise present tract selection

procedures so that more tracts in which industry has expressed an interest are included in the areas offered for lease;

B. NOAA's proposal for a "bid commitment" step in the leasing process. NOAA Comments, pp. 4-5. Under this procedure, the leasing process could progress from the call for information, to area selection, to submission of bid commitments, to area-wide environmental assessment of tracts receiving commitments, to bid acceptance for tracts receiving favorable environmental assessment, to submission of bid monies by successful bidders. This procedure has several advantages over DOI's proposals, one of which would be an increase in the quality of relevant environmental information available to the decision-makers;

C. The proposal put forward in the March 19, 1981 Memorandum from the Assistant Secretary to the Secretary (p. 5) calling for inclusion in the areawide EIS of a detailed analysis of the tracts proposed for initial offering, i.e., a regional statement with a site-specific component. Supplemental EIS's could be used for subsequent offerings.

In conclusion, the radical shifts in leasing procedure

and policy proposed merit careful scrutiny in the SES and may not be glossed over as they have been in DSES.

2. The DSES Fails to Adequately Analyze the Effects of the Proposed Schedule and Reasonable Alternatives to It.

The DSES fails to carefully assess the effects that opening up such vast areas so rapidly will have on industry's ability to conduct and Interior's ability to monitor and ensure safe operations. The recent NAS report, referred to above, and the GAO report on the "Impact of Regulations--After Federal Leasing--on OCS Oil and Gas Development" (February 27, 1981) point out present deficiencies in the industry's capabilities in terms of equipment and skilled personnel and in DOI's post-leasing enforcement program.

The NAS report (pp. 234-6) states that the need for new drilling crews is likely to increase 10 percent per year. (This projection was made before the revised program was proposed.) Because of the high rate of attrition in the offshore work force, as many as 2,000 to 3,000 new drilling workers must be hired each year. This continuing demand for new recruits coupled with the high rate of turnover in the labor force affects safety: a high rate of turnover means that the labor force has a high proportion of new and inexperienced workers. For example, many engineers in supervisory positions now have only three to five years experience as against the 15-20 years common in the past.

The reduced level of experience of supervisory and engineering personnel has impacts on safety. The NAS report quotes the vice-president of a large offshore drilling company:

> "Due to the rapid expansion of the worldwide rig fleet, another force has been working against the average performance levels of the higher skilled people. So many have been promoted so fast to fill the key positions on newly constructed rigs--as well as to take superintendent and rig manager positions--that a large percentage of these key people are working in responsibilities beyond their training and experience."

The NAS found that because the number of skilled technicians is limited and because drilling is on the increase, there is a danger that blowouts might increase. This conclusion is of even more significance now in light of Secretary Watt's proposed revision.

The revised program will increase the need for personnel. Coupled with the high turnover rate, this will increase the proportion of inexperienced workers, increase the safety hazard and risk of oil spills. These effects must be analyzed in the SES.

DOI's ability to ensure safe operations is also called into question by this proposal. The GAO report found that DOI fails to monitor and enforce industry compliance with plans for exploration and development (POE's and POD's). (Report at 18-19) How does Interior plan to monitor and enforce adherence to POE's POD's and other regulatory requirements under this greatly

accelerated leasing program. This needs to be addressed in the SES.

Additional consequences of the proposed program which need to be discussed in the SES, but are not, include: the effect of not completing important environmental studies in advance of certain lease sales--something the DSES admits will happen but the consequences of which it fails to analyze; the potential increase in adverse coastal impacts because of the reduction in federal funds to states for mitigation of OCS impacts; and the amount and effects of the increase in routine discharges (e.g., drill muds, cuttings and produced waters,) likely to result from the accelerated schedule. (The NAS study underscores the importance of these discharges and the need for more effective regulation, pp. 61-84).

The new program will greatly increase the volume of drilling muds and cuttings, formation waters, and oils discharged into the marine environment. The DSES dismisses the effects of these discharges and it does not evaluate the impacts of increased discharge volumes (p. 28). Although scientists do not agree on the cumulative and long-term effects of these discharges, that does not mean the possible effects should not be identified and discussed in the DSES.

In addition, NRDC believes that the Final Supplement needs to provide an explanation as to the basis for assuming the particular mode of transport of oil and gas ashore from the different planning areas. (See Table III-3 at 14-15). For

example, pipeline transport is assumed from the North Atlantic even though the Sale 42 FES assumed transport by tanker. Since tanker transport is recognized by Interior as a possible mode of transport from many areas (for example, in the Mid-Atlantic, as discussed in the Sale 59 FES), NRDC submits that the analysis of potential oil spills should include an analysis based on an assumption of tanker transport, not pipeline transport.

The discussion in the DSES of alternatives to the proposed program is too limited in scope. As pointed out above, alternatives to the proposed streamlining procedures are not explored. Nor are alternatives involving offerings somewhere between the 200 million acres/year contemplated in the proposed program and the offerings under the present program. There is a real question as to whether industry will be able to respond to the offering of entire planning areas, as proposed. In their comments to the Secretary on the April preproposal, numerous companies offered alternatives to leasing entire planning areas--the most common suggestion being to offer 3 to 10 million acres at one sale.*/ This alternative scale of leasing is not discussed. The alternatives presented in the DSES propose offering entire planning areas (Alternatives 1,2,5,6) or offering existing sale sizes (Alternatives 3,4), with no discussion of alternatives to these

*/ Letters to Secretary Andrus from Mobil, British Petroleum--Alaska, Sohio, Champlin on the April 16, 1981 draft program.

two extremes. The Final Supplement should contain such a discussion.

3. The DSES Fails to Analyze the Impacts of the Proposed Changes in Planning Area Boundaries

A major change in the Secretary's draft program is the modification of planning area boundaries. The draft program (4/17/81) announces changes to the boundaries of the North Aleutian Shelf, St. George Basin and Diaspir Field (formerly the Beaufort Sea). The changes are merely listed in the Federal Register notice and shown on a map in the DSES. The program just announced by Secretary Watt contains additional boundary changes.

The reasons for these changes and their consequences deserve full disclosure in the SES. Of particular concern to NRDC is the DSES's total omission of any discussion of the expanded boundary of the North Aleutian Shelf. This change is very significant as prime fishing grounds which were purposefully avoided in the June 80 program would now be included. The description of the Environment (Section III) should discuss the effects of all boundary changes. The impact discussion, particularly for the North Aleutian Shelf (IV-3, p. 38) should contain a more extensive discussion of the new area affected by these changes.

Another boundary change of concern is the expansion of the Diapir Field to include portions of what was formerly the Chukchi

Sea. The effect of this is to make a portion of the Chukchi Sea available for leasing several years earlier. This needs to be pointed out and discussed in the SES.

The new planning areas, including Shumagru, Aleutian Arc, Bowers Basin, Aleutian Basin, St. Matthew-Hull all deserve a careful description, as well as an explanation for the delineation of each.

4. The Assumptions on Which the Impact Assessment of Alternative I is Based are Erroneous

The description of Alternative 1 (Section II A.1.) identifies the assumptions that went into development of the proposal. We take issue with several of these assumptions. First, the DSES states that if planning areas are offered, Alternative 1 assumes that "industry will be able to inventory planning units much more completely than in the past, and all of the resources will be discovered much more quickly." (p. 16). This assumption runs counter to a large number of General Accounting Office (GAO) reports on OCS leasing.*/ These reports have shown that the

*/General Accounting Office, "Some Issues Affecting Southern California Outer Continental Shelf Oil and Gas Lease Sale 48," May 5, 1980. General Accounting Office, "Lower Cook Inlet--Another Example of More Data Needed for Appraising Outer Continental Shelf Oil and Gas Resources," June 8, 1978. General Accounting Office, "Outer Continental Shelf Sale 40--Inadequate Data Used to Select and Evaluate Lands to Lease," June 28, 1977. General Accounting Office, "Georgia Embayment--Illustrating Again the Need for More Data Before Selecting and Leasing Outer Continental Shelf Lands," March 19, 1979.

number of tracts leased does not depend on the number of tracts offered. Essentially, the more offered, the smaller the precentage of tracts actually leased. The DSES assumption also runs counter to the response that the oil and gas industry felt it would be able to make to the scale of offerings contained in the April proposal. Numerous companies responded that an adequate and thorough response could not be made to offerings of entire planning areas.*/

Another assumption, that "a sufficient number of rigs will be available in each sale area to allow for reasonable exploration and development activity" (p. 16) runs counter to current information on rig availability. Acreage offerings are proposed to increase by over 1000% under Alternative 1. Currently, there is a shortage of drilling rigs and the number of drilling rigs is increasing only at 10-15% each year. With limited rigs available, the DSES is wrong to assume that no constraints exist in this area.

Although not discussed, DOI appears to assume that shortages of qualified personnel and of available capital will not act as constraints to the success of the proposed program. The consequences of such constraints should have been fully discussed.

*/ Letters to Secretary Watt on the April 17, 1981 proposed program from Pogo Producing Company, Exxon, Atlantic Richfield, and the American Petroleum Institute.

Alternative 1 proposes a major revision in the manner in which the oil and gas potential of an area is calculated, from a "risked" estimate to a "conditional" estimate (p. 13, 27). This change means that comparison between the June 80 and April 81 programs and between the FEIS and the DSES are very difficult to make. The DSES makes no effort to explain why this change was made at this stage in the analysis nor how the new estimates can be compared to the old.

5. The DSES Fails to Discuss Mitigation Techniques

The DSES contains no discussion of mitigation techniques. Traditionally, the OCS program has identified mitigation techniques, particularly stipulations, as part of the Proposed Notice of Sale. Stipulations are geared to the characteristics of a particular tract. Without the tract specific analyses that are currently done, it will be virtually impossible for USGS to identify tracts which require special stipulations or which should be deleted altogether. In the absence of these traditional mitigation techniques, Interior must identify what new techniques it intends to employ. The environmental consequences of not being able to delete tracts or design stipulations for particular tracts must also be discussed. The failure to discuss mitigation is a major shortcoming of the DSES.

6. The DSES Fails to Address Section 18 Considerations

In the development of the Five Year Program, the Department

is required to consider a number of factors, including an equitable sharing of benefits and risks, relative environmental sensitivity and marine productivity of different areas, and relevant environmental and predictive information. Section 18 of the OCSLA. Neither the DSES nor the April program discusses or analyzes these considerations. As the program must be based on consideration of these factors, they should be addressed in the documents circulated for public review and comment. The Supplemental Impact Statement is an appropriate and desirable place for a discussion of the §18 environmental factors.

7. Conclusion

To conclude, we find the DSES seriously deficient. It fails to analyze alternatives to and the effects of the substantial program changes proposed by Secretary Watt. We believe the DSES fails to comply with NEPA.

Pacific Alaska LNG Associates

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Telephone 907/276-2288

AUG 6 11 13 AM '81

August 4, 1981

Ms. Esther Wunnicke
Outer Cont. Shelf Office
P.O. Box 1159
Anchorage, AK 99510

Dear Ms. Wunnicke,

I think the proposed OCS lease sale schedule is very appropriate.

Sincerely,

Len McLean

SIERRA CLUB

530 Bush Street San Francisco, California 94108 (415) 981-8634

August 7, 1981

TO: Manager, Pacific OCS Office
Bureau of Land Management
1340 W. 6th St., Room 200
Los Angeles, CA 90017

FROM: Michele Perrault, Sierra Club and Environmental Coalition on Lease Sale #53 and #73

RE: Comments on the Draft Supplement to the Final Environmental Impact Statement on the Proposed 5-Year OCS Oil and Gas Lease Sale Schedule

The following comments incorporate and expand upon those we gave at the Bureau of Land Management (BLM) hearing on July 23 in Los Angeles. We ask that these be considered and included as changes in the Final Supplement to the Final Environmental Impact Statement (FEIS).

As you are aware, the Sierra Club, along with the Natural Resources Defense Council and the States of California and Alaska, have asked the court to remand the June 1980 5-Year Oil and Gas Leasing Program to the Department of Interior, due to inadequacies and violations of the Outer Continental Shelf Lands Act, as amended, the National Environmental Policy Act, and the Administrative Procedures Act. The revisions to the June 1980 version proposed in the Draft Supplement to the FEIS do not correct any of these inadequacies or violations, and in fact exacerbate several of them.

These revisions represent a radical departure from Outer Continental Shelf (OCS) leasing as it has occured under the OCS Lands Act Amendments of 1978. Secretary of Interior Watt proposes to offer for lease close to 1 billion acres over the next 5 years. This is virtually the entire Outer Continental Shelf. Lease offerings of entire planning areas will encompass up to 50 million acres in a single sale, compared to an average of 2 million acres per sale under the current program. The scale of the proposed program makes thorough environmental review and analysis impossible. We do not believe that such leasing of coastal waters, on the sole basis of hydrocarbon potential, reflects the OCS Lands Act balancing provision.

Our specific concerns follow:

1) The proposed 5-Year Program violates provisions of Section 18 of the OCS Lands Act, as amended. It violates provisions which require that the 5-Year Program be based on consideration of various factors, including an equitable sharing of environmental risks among the various regions; other uses of the sea and seabed; the laws, goals, and policies

of affected states; and relevant environmental and predictive information. Further, Section 18 requires that the 5-Year Program define "as precisely as possible, the size, timing, and location of leasing activity." The size of the planning areas to be offered as proposed in this document clearly does not meet this requirement.

In addition, Section 18 also requires the 5-Year Program to provide "a proper balance between the potential for environmental damage, potential for discovery of oil and gas, and the potential for adverse impact on the coastal zone." The quantities of oil and gas likely to be produced from the Eel River, Point Arena, Bodega, and Santa Cruz Basins, and the northern 34 tracts of the Santa Maria Basin do not justify the environmental and social damage likely to occur if drilling proceeds in these areas.

2) The increased size of the lease areas and the corresponding environmental and social impacts are not acceptable. We disagree with the Secretary of Interior's position that the OCS leasing process will allow the Administration to meet its goal of increasing domestic energy in "an environmentally sound manner." This statement is illogical, given that the BLM is cutting its budget for the OCS Environmental Assessment Program by as much as 50%, and the Administration is proposing total elimination of federal funding for the only program which assists states in mitigating the impacts from OCS development: the Coastal Zone Management Program.

3) The proposed "streamlining" would include elimination of tract-specific information on oil and gas reserves, environmental resources, and geohazards. Environmental Impact Statements would be prepared for entire planning areas, ranging in size from 9 million acres to 160 million acres, with limited site-specific information. The consequences of this streamling are to do away with environmental safeguards.

4) Elimination of tract selection precludes the Department of Interior (DOI) from obtaining tract-specific geological and biological information, and thus eliminates the identification and deletion of tracts which are ecologically sensitive or geologically hazardous.

5) The areas to be offered for lease include some of the richest fishing grounds off the United States, such as Georges Bank, Bristol Bay, and Northern California, as well as critical marine mammal migratory routes along the California and Alaskan coasts, and major seabird habitat. It also includes waters along the country's most scenic shorelines, which generate a multi-billion dollar tourist industry.

6) We question whether the oil and gas industry and the DOI will be able to ensure safe operations if up to 1 billion acres of the OCS are opened up in the next 5 years. The oil and gas industry has been experiencing a two-year boom in drilling. Onshore and offshore rig utilization is near 100%. The industry itself has expressed to the Secretary of Interior its concern that it can not handle the large acreage per sale that is being proposed. We wish to incorporate by reference here the July 23, 1981 testimony of Ms. Connie Parrish, California Representative of Friends of the Earth, before the BLM in Los Angeles. Her testimony documents extensively the strain and unsafe conditions the industry would face if such large acreage was offered, year after year.

We also refer you to the study released by the National Academy of Sciences on June 5, 1981. The study documents the problems relating to inadequately trained workers on offshore oil rigs, which contributes to the risk of blowouts.

7) We are opposed to the proposed "tiering" of Environmental Impact Statements. This method overlooks the fact that oil industry interest in a sale, particularly under a streamlined decision-making process, creates a snowball effect which would make it easier for companies to pursue activities without the close watchdogging that occurs in the pre-lease sale stage.

8) We are concerned about offshore oil and gas development creating, as the document indicates, competition for available waters in Northern California, posing a potential for lowered groundwater tables or depleted stream resevoirs. The Final Supplement to the FEIS should be more specific as to how this would occur.

9) Since the State of California has just sued on the air quality regulations as administered by the DOI, the problems in this area should be further addressed in the Final Supplement to the FEIS.

10) A more thorough analysis of impacts on recreation should be stated in the Final Supplement. The current proposal notes that such impacts will be high.

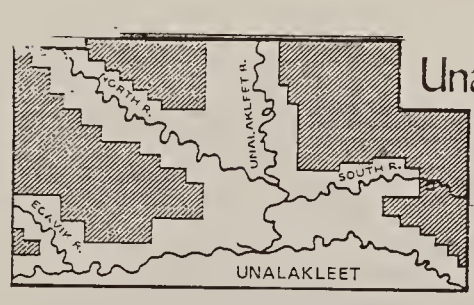
11) We challenge the Administrations's assumption that the best way to satisfy the nation's gluttonous desire for energy is to accelerate offshore oil drilling, while not more aggressively pursuing programs to encourage use of solar power and to mandate energy conservation. A comprehensive national energy policy, which emphasizes a variety of options, particularly conservation and the use of renewable resources, is needed to reduce our dependence on oil. The energy equivalent of barrels per day of oil saved by strengthening programs in these areas and the transportation sector should be analyzed in the Final Supplement to the FEIS.

12) We wish to incorporate, by reference, the comments of Michael Herz of the Oceanic Society and Sarah Chasis of the Natural Resources Defense Council on the Draft Supplement to the FEIS.

Secretary of Interior Watt's proposal is unacceptable as it now stands. The Administration should listen to the many states and citizens critical of the proposed 5-Year Oil and Gas Program, so that the nation can proceed to develop its resources in a sound manner which meets a variety of national needs, without destroying the very resources that support us on this fragile earth.

cc: Managers, OCS Offices in New York, New Orleans, Alaska
Chief, Division of Offshore Resources, BLM, Washington, D.C.

MP/mkm



Unalakleet Native Corporation

P.O. BOX 100
Unalakleet
Alaska 99684
(907) 624-3411

August 10, 1981

Director
Bureau of Land Management (542)
Department of the Interior
18th & C Street, N.W.
Washington, D.C. 20240

RE: Position Paper
Unalakleet Native Corp.
Proposed Five-Year OCS
Oil & Gas lease sale Sched

Dear Sir:

Pursuant to your invitation for comments concerning the draft environmental statement, enclosed is the original of the comments of the Unalakleet Native Corporation (UNC).

We respectfully request that you give your full attention to our concerns.

This is also a formal request for a private audience with secretary Watt by myself in my capacity as Board Member and General Manager of UNC and also a resident of Unalakleet to personally speak my concerns regarding accelerated OCS activity in the Norton Sound Region.

Very Truly Yours,

UNALAKLEET NATIVE CORPORATION

By: Helga Eakon
Helga Eakon, General Manager

NORTON SOUND FISHERMEN'S COOPERATIVE
P.O. BOX 10
UNALAKLEET, ALASKA 99684

August 10, 1981

Director
Bureau of Land Management
Department of the Interior
18th and C Street, N.W.
Washington, D.C. 20240

RE: Comments - Proposed Five Year OCS Oil and Gas Lease Sale Schedule

Dear Sir:

This is to support the position paper submitted by the Unalakleet Native Corporation regarding the proposed acceleration of OCS activity in the Norton Sound region.

The Norton Sound Fishermen's Cooperative (NSFC) presently has a membership of 135 commercial fishermen and local residents of the region.

In 1980 the herring catch was 800,000 pounds, and in 1980 the following poundage was caught in the Norton Sound waters: King Salmon-93,191 pounds; Chum salmon-384,806 pounds; pink salmon-623,145 pounds and Coho-87,078 pounds.

We are very concerned about the impacts of OCS activity on our fishery and fishing activities. Fishing is the main economic livelihood during the year for many of our fishermen.

We support the stance of the Unalakleet Native Corporation with regard to OCS activity in the Norton Sound region.

Sincerely,

R. Weaver Ivanoff
President

National Audubon Society
ALASKA REGIONAL OFFICE
308 G STREET, SUITE 219, ANCHORAGE, AK 99501 (907) 276-7034

Director
Bureau of Land Management
Department of Interior
18th and C Streets N.W.
Washington, D.C. 20240

August 10, 1981

Dear Mr. Director,

This letter is to express the National Audubon Society's serious concern regarding the proposed accelerated five year outer continental shelf oil and gas lease schedule as outlined in the Draft Supplement to the Final Environmental Statement - January 1982 -November 1986.

The principle purpose of the accelerated schedule, as we understand it, is to encourage the rapid exploration, inventory and development of outer continental shelf (OCS) oil and gas resources. We share a belief that a balanced and timely assessment of the wide variety of our nation's needs and demands in the energy field be accomplished. This obviously includes the need to determine the extent of our OCS oil and gas potential and to provide for a rational and fairly predictable sequence for its development.

While this need is indeed great, the development strategy outlined for the Alaskan OCS in the Draft Supplement does not appear orderly, sound, or in the best interest of the State of Alaska, the federal government or the integrity and continued viability of the tremendous international fish and wildlife resources of the area.

In overview, the accelerated schedule appears acceptable,

adding only six sales to the original five year plan proposed by former Secretary of the Interior Andrus, yet all six are in frontier areas off Alaska's shores bringing leasable acreage to well over 500 million acres.

Waters of the Alaskan OCS produce some of the nation's and the world's richest fish and wildlife populations. The shelf produces over 4.7 billion pounds of harvested seafood each year, over 3 billion in the Southern Bering Sea alone. The St. George Basin, North Aleutian Shelf and Bristol Bay are internationally recognized as the second most productive fishing area in the world, and the most important in U.S. waters. Fight endangered species of whales inhabit the sale areas, and much of the range of the endangered bowhead whale is slated for leasing.

The site of enormous migratory bird use, the coast of mainland Alaska is sometimes located hundreds of miles from the lease areas, yet many places like the Bering Sea National Wildlife Refuge (St. Matthew group) are located very close (in this case about 30 miles) to the proposed lease areas. About 1.5 million seabirds nest on the islands of this wilderness Refuge. Many birds of the Refuge may utilize feeding areas within the proposed lease area, particularly near the shelf edge zone, a region rich in nutrients and food organisms. The Bering Sea National Wildlife Refuge and its adjacent feeding areas should be considered highly sensitive to adverse impacts of OCS hydrocarbon development and production, yet like other issues in the OCS, detailed impacts to these important islands are not directly discussed in the Final Environment Statement or the Draft Supplement.

The Draft Supplement does an inadequate job in examining the potential impacts of shore-based facilities and staging areas, stating only that "impacts on virgin coastlines" and "existing ports" are expected to intensify."

Of further concern to the National Audubon Society is the drastic funding cutbacks of the Outer Continental Shelf Environmental Assessment Program (OCSEAP). Much has been learned by OCSEAP scientists the past few years regarding arctic marine and coastal ecosystems. The program has begun to fill in some of the voids in information about the arctic, but there is widespread agreement that more time is needed to develop comprehensive baseline information. Such information is essential to intelligently plan and carry out leasing and sales in a safe and efficient manner.

The current policy to rush ahead with the frontier oil and gas leasing schedule when so little scientific data is available about the lease areas is inexcusable. Slashing the funding of the one program which is studying the leasing areas appears to be a conscious effort to ignore environmental concerns in the OCS leasing process.

The Leasing Process:

Descriptive and detailed social, economic and environmental results of the Draft Supplement are largely ignored. Little comparative analysis is made between the relative merits and impacts of the proposal, the current leasing schedule and procedures and alternatives. In the move to accelerate the leasing process, too many difficult questions are going unanswered.

For example, the Draft Supplement cannot predict the level of industrial activity the proposal will generate. With regard to drilling rigs and equipment, the document states:

> "how many of these (beyond the present OCS inventory) will be used and where in the OCS they will be put is difficult to tell at this early stage." (p.16)

The role of production:

> "cannot be predicted because of the radical departure this five-year leasing program makes with the past." (p.17)

In reference to refining capacity:

> "it is premature to attempt to determine the effects of the proposed schedule on U.S. refining capacity..." (p.17)

Although transportation systems will have to be "substantially altered" the document states that an analysis of transportation impacts generated by the accelerated proposal is "too conjectural."

The National Audubon Society believes that the pace of development advocated by this proposal severely strains the capabilities of all concerned with offshore development to respond effectively.

Although a few oil-related companies have requested immediate leasing in all the Alaskan OCS areas, most companies have publicly recognized that insufficient geological information, capital, and technology exists to either explore or develop many of the areas in the proposed five year lease schedule.

The proposed schedule conflicts with the expressed goals and policies of the State of Alaska and as stated in its Coastal Management Act. District coastal zone management programs, a critical component of the Alaska Coastal Management Program, are currently under development, they are not yet in place. To force the leasing of the Alaskan OCS now would thwart the entire coastal zone management planning concept in the state.

The proposed revision of the pre-leasing process (i.e., the Call for Nominations, Scoping, D.E.I.S., E.I.S.,etc.) will essentially double the existing sale workload on Bureau of Land Management, U.S. Geological Survey and OCSEAP personnel, compressing the current 42 month process in 1981 to 21 months in 1983. The addition of nine new lease sales by 1986 will further increase the existing workload by 90 percent. All of this with no concurrent increase in funding for environmental evaluations.

The proposed revision will demand that environmental impact statements be written in general form on a basin-wide basis. Although the E.I.S.'s would now cover several times the area that the tract selection E.I.S.'s under the old schedule would cover, there has been no committment to increase necessary funding levels.

The elimination of the tract selection process constitutes a very serious threat to the integrity of the E.I.S. process. It was during this stage, in the past, that most of the hazardous or environmentally sensitive areas were deleted. Even though very large tract selections were offered, this pre-leasing step helped focus resource evaluations on a more manageable area. If this proposal is forwarded, the outcome will be a very superficial review, one that will not provide a balanced assessment of the various resource values or provide for mitigating measures to minimize development impacts.

Given the severe environmental hazards associated with many Alaskan OCS areas, and the unproven exploration, production, transportation and clean-up technologies to be applied there, we believe that such a short term sale would serve as an improper incentive for industry to proceed with too much haste and risk.

We therefore urge that serious consideration be given to developing a 10 year rather than a 5 year sale. This would better assure that fair market value is received for the energy resources that may lie off Alaska's coast. It would allow industry to proceed gradually and carefully, without speculation, from protected drilling sites to those that are more risky in hazardous frontier areas. Also of great importance is that a longer lease period would allow for the gathering of critically needed baseline environmental data, and research and development in arctic production and clean-up technologies.

The overall goal of the Outer Continental Shelf Lands Act

is to "seek a balance between the orderly development of offshore energy resources and the need to protect environmental and social values". The National Audubon Society feels that the leasing pace outlined in the Draft Supplement allows inadequate time for careful study of each area to determine its oil and gas potential as well as its value to fisheries, wildlife, rural lifestyles, and both the short and long term benefits to state and national economies.

Your consideration of these matters is greatly appreciated and we will be most happy to provide any additional information that may prove useful as you approach a decision on this issue.

Sincerely,

Roy Andrew Barnes

Roy Andrew Barnes
Regional Representative - Alaska

Valdez
Tatitlek
Eyak
Chenega
Seward
English Bay
Port Graham

the north pacific rim

August 7, 1981

Director
Bureau of Land Management (542)
Department of the Interior
18th & C Streets, N.W.
Washington, D.C. 20240

Dear Sirs:

We appreciated the opportunity to appear before the panel at the public hearing on July 23, 1981 in Anchorage, Alaska to offer oral comments on the Draft Supplement to the Final Environmental Statement on the Five-Year Lease Schedule.

At this juncture, we would like to submit an elaboration on the oral comments, together with some additional suggestions corresponding to the Draft Supplement.

The North Pacific Rim is the regional non-profit corporation serving the communities in the Chugach Native region. All seven of the communities that we serve are coastal villages and towns deriving a substantial portion of their livelihood from the coastal and marine resources, whether the livelihood is subsistence, commercial fishing, or tourism-related industry. Outer Continental Shelf activity is therefore of imminent import to every community.

Again, we wish to express our appreciation and approval of the proposed deletion of Sale 61 from the schedule. Besides the significant commercial fisheries which stood to be impacted by development activities in the area, the villages of English Bay and Port Graham engage in many subsistence activities, have numerous historic sites in the vicinity, and depend on the natural resources in the Sale area and neighboring areas. All of which would be subject to indirect affects resulting from development or oil spills.

Proposed Sale 100 is of immense concern to our organization and to the villages which lie in our region. The proposed sale area clearly includes four entire planning areas, comprising 202 million acres of the Alaska Outer Continental Shelf. The proposed sale area potentially impacts not only critical commercial fishing areas in the Kodiak Island area, but also renders vulnerable extensive subsistence resources and locations. Additionally, the proposed Sale 100 includes a great deal of acreage bordering the Prince William Sound, an area heretofore

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The Development Corporation Serving The People Of The Chugach Native Region

excluded from any leasing schedules because of its tremendous scenic, recreational cultural and economic value to not only local residents, but all Alaskans and US citizens as well.

It is difficult to see how proposed Sale 100 will meet the 1978 OCSLAA requirement for a program "indicating as precisely as possible, the size, timing and location of leasing activities. Unless 202 million acres are to be leased one must suppose greater precision is not only possible, but mandated.

From a local planning level, Sale 100 presents insurmountable challenges. Communities liable to experience significant impacts for the first time from a Sale and subsequent activities include Chenega, Tatitlek and Eyak/Cordova.

Chenega poses the most interesting situation. The village, destroyed in the 1964 earthquake, will be rebuilt and repopulated during the summers of 1982 and 1983. Thus at the same time they are being reestablished after 20 years of dispersion, they will be required to respond to the whole gamut of pre-oil leasing activities. This is compounded by the fact that Chenega and Tatitlek lie in the unorganized borough, and have no formally recognized mechanism for control and use planning of the coast and the OCS resources. In fact, with the Chugach Region Land study group still meeting, much of the land in Prince William Sound is of unresolved ownership. Certainly who owns and manages what lands will be important in the evolution of land and resource use and management plans.

The proposed streamlining of the leasing process is also a source of concern for people in the Chugach Region. There are two phases being abbreviated that we find most dangerous. First of all, it would appear that OCS staff will have more restricted time for the scoping portion. Scoping is the crucial step in the process, if indeed gaining public input is an integral factor in the whole program. A complete, responsible scoping of all the interests and facts of the proposed sale is the key to a comprehensive environmental impact statement. An even tighter calendar will effectively preclude the rural population as they are the most difficult to get together with.

The second place we feel the streamlining will have particularly detrimental affects is the one month allowed for response to call for information. This again most acutely affects rural Alaskans. Given the time required for mailing, the experience that villages are frequently overlooked on distribution lists, and noting the lifestyle which may well mean a number of people may not even be in the village or reviewing paperwork at the time a notice might arrive, one month is an extremely short period of time.

Focusing on the Oraft Supplement itself, we have the following comments:

1) Cumulative impacts are not dealt with at all.

2) NEPA section 1500.2 (d) states that "federal agencies shall to the fullest extent possible encourage and facilitate public involvement in decisions which affect the quality of the human environment". The Oraft Supplement was not available until June, and the public hearing was in July with comments due by August 10. This schedule precludes the involvement of commercial and subsistence fishermen, e.g. those directly impacted by the OCS leasing activities.

This does not consitute encouraging and facilitating public involvement.

3) Page 49 of the Supplement: Last sentence of the first paragraph beginning "The size..." is not intelligible.

4) The FEIS addressed identified specific areas of leasing potential, including the Eastern Gulf of Alaska, and the Kodiak Shelf. Yet the Supplement encompasses the entire Gulf, Cook Inlet, Kodiak and Shumagin planning areas. If leasing occurs throughout all four planning areas, it is likely that more than low use conflicts and impacts on subsistence cultures (page 58, Supplement) would be experienced.

   The Prince William Sound appears extremely vulnerable in this scenario. While leasing is highly unlikely within the Sound proper, impacts are still immiment. Increased tanker traffic and higher oil spill probabilities, among other possible affects could severely affect communities such as Tatitlek, Chenega and Cordova. The economy of all three communities are singularly dependent on the marine resources, especially salmon.

5) Page 55 of the Supplement states that "Remaining sales in Alaska are either second entry sales for which information will be available or there will be time to obtain the date providing contracts for research are approved and funded.
   a) Prince William Sound and Shumagin are frontier areas.
   b) "there will be time" Time is not the strong point of the schedule.
   c) If time is available, is staff?
   d) "approved and funded" and if they are not? What are the contingency plans?

6) Page 62. The last sentence of the paragraph is unintelligible.

At the public hearing, one panel member suggested that only a single planning area in Sale 100 will be chosen. If Sale 100 is to be treated differently than other Sales, this should be reflected in the Final Supplement. In the absence of such a clarification one can only assume that 202 million acres are being put up for sale.

At this point in time neither The North Pacific Rim nor its communities have any formal position. We do, however, have two recommendations;

1) That if any portion of the currently proposed Sale 100 area is to be seriously considered, that the size be greatly decreased to the maximum acreage of a single planning area.

2) That public invomvement remain a priority in the leasing process, encouraged by sufficient scoping and response times.

Attached is a copy of our oral testimony. Thank you for your careful consideration of our concerns.

Sincerely,

Robert B. Heasley
Acting Executive Director

jm

cc: Gretchen Kaiser
Bruce Baker
Alaska OCS Office
Vincent Kvasnikoff, President E.B. Council
Walter Meganack, President,P.G. Council
Gail Evanoff, President, Chenega IRA
Agnes Nichols, President, Eyak Village Council
Carol Benoit, Chairperson, Mt. Marathon Native Association
Helen Dunlap, President, Valdez Native Association
Gary Kompkoff, President, Tatitlek Village Council

Attachment

To 1.510

NATIONAL WILDLIFE FEDERATION

ALASKA NATURAL RESOURCE CENTER
835 "D" STREET, SUITE 204
ANCHORAGE, ALASKA 99501
907/276-5332

August 13, 1981

Robert Burford
Director, Bureau of Land Management
Department of Interior
18th and C Streets N.W.
Washington, D.C. 20240

Dear Mr. Burford:

The National Wildlife Federation, Alaska Resource Center, appreciates the opportunity to comment on your draft proposed OCS oil and gas leasing program for the period 1982-1986, and the accompanying Draft Final Environmental Impact Statement.

The NWF recognizes the need for a long-term national energy program. Additionally, we realize that Outer Continental Shelf (OCS) lands must contribute to that program. As such, we are not totally opposed to offshore leasing. The Federation does, however, advocate leasing schedules which reflect a balanced approach between immediate national energy needs, and the nations longer term environmental interest. We believe that this schedule as proposed fails to establish this balance. We are opposed to both the size of the individual sales as well as the rapid pace of leasing.

Inherent in the inadequacies and shortcomings of the program is the fact that it was developed in a manner inconsistent with the requirements of Section 18 of the Outer Continental Shelf Lands Act amendments (OCSLAA) of 1978. Specifically, subsections 18(a)(2), 18(a)(3) and 18(d).

Section 18(a)(2) specifically calls for a decision to be based upon a balanced consideration of the eight factors articulated within the section. It appears that the driving force behind this schedule is primarily the perceived need to accelerate OCS oil and gas development, and that other factors in Section 18(a)(2) played a minimal role.

A balanced application of the considerations specified in Section 18(a) would seem to mandate against rapid and intensive entry into frontier areas of Alaska. There is little doubt that "the relative environmental sensitivity and marine productivity" of these areas are uniquely high (Section 18(a)(2)(G). Converesely, the resource potential of many of these areas is not exceptional (Section 18(a)(2)(A). Intensive development of these remote areas in the immediate future may very well eliminate the potential for coastal communities to influence development through the Coastal Zone Management (CZM) Process (Section 18(a)(2)(F). Residents of coastal western Alaska are within the unorganized borough. Residents do not have local zoning and planning powers, and the CZM Program provides the only tool that enables these people to control their own future.

It is disconcerting to note the inequities between a greatly expanded OCS Leasing Program and a projected greatly reduced federal budget to planning programs designed to mitigate impacts of OCS activities. The Coastal Energy Impact Program (CEIP) grants to states will be terminated in FY-82 if proposed budget cuts are adopted. These reductions in conjunction with reduced funding for CZM Programs will undoubtedly reduce both State and local governments' ability to participate in the leasing program.

The Supplemental Environmental Statement (SES) fails to alert the reader to a very serious situation concerning drilling equipment and personnel. As early as October, 1980, the Oil and Gas Journal reported that equipment shortages were interfering with industry's ability to explore land already leased from the federal government. The lack of trained personnel was another problem mentioned. The National Academy of Science, in its April, 1981 report on OCS safety, echoes these concerns. These safety concerns are amplified when the extreme weather and sea ice conditions within Alaskan waters are considered. This situation argues strongly that DOI should be slowing down the OCS schedule, not accelerating it.

In reviewing the possible impacts of the proposal, the SES provides only the most superficial discussion. Instead of a thorough evaluation, the document merely states that the types of impacts will remain the same, only larger. For instance, concerning impacts to commercial fishing in the Northern Aleutian Basin, the SES notes that "it is impossible to tell at this time how many, if any, of the platforms or exploratory wells would be located close to or in the fishing areas". This of course means that there is no realistic projection of impacts to the fishery.

Another problem is a lack of baseline environmental data. This limited resource information base in conjuntion with the lack of oil spill trajectory models make estimates of potential impacts almost meaningless.

There is a very strong need for the Department of Interior to alter its existing federal leasing schedule. We suggest that the lease areas be divided into three categories.

The first category should consists of areas for which proven technology for oil and gas development exists today. These are areas where intrastructure is already advanced and proven technological and safety programs exist. These areas are the eastern Gulf of Alaska and The Lower Cook Inlet.

The second category consists of areas in which leasing may be appropriate during the latter portion of the 1980-1985 period, contingent upon the completion of local coastal management plans and progress in developing exploration and development techniques, transportation methods, and methods or measures designed to mitigate potential adverse environmental effects. These areas are; Navarin Basin, Norton Basin, Hope Basin, and Kodiak Shelf.

The third category includes areas in which leasing should be postponed for an indefinite time until we have a comprehensive environmental data base, major breakthroughs in technological capability in Arctic waters, and complete coastal management plans. These areas include the Chukchi Sea, Southern Aleutian Shelf, St. George Basin, Northern Aleutian Shelf including the entire Bristol Bay area and Ice-Pack Zones of the Beauford Sea.

The National Wildlife Federation, Alaska Resource Center, appreciates this opportunity to respond to the DOI revised 5-year OCS Oil and Gas Leasing Program

Sincerely,

Bruce N. Apple

BNA/rhm

BRISTOL BAY NATIVE ASSOCIATION
P.O. BOX 179
DILLINGHAM, ALASKA 99576
PHONE (907) 842-5257

TO: James E. Watt
Secretary of the Interior

FROM: Jane Koenitzer
OCS Coordinator

DATE: July 29, 1981

RE: Draft Supplement to the Final Statement: 5-Year OCS Schedule

Planning Efforts

Several planning activities at the local, state and federal levels are currently being initiated that will closely parallel some of the efforts of the Alaska OCS Office. No local efforts are underway to actively plan for/on OCS lands, but through the Bristol Bay OCS Advisory Committee there is a movement underway to inform the residents and organizations of the issues and decision-point milestones emminating from the federal and state leasing processes. Unfortunately, there is no local expertise with which to develop or interpret scientific/technical development alternatives. Nor does the capability exist to fully understand resource potentials and the identification of all the development parameters which must be evaluated with resource development and exploration.

The Bristol Bay region has been designated as a Coastal Resource district under the State of Alaska Coastal Zone Management Plan. The formation of a Coastal Resource Service Area Board will take place in early 1982. It is anticipated that a normal three year investigative, planning period will lapse (in 1985) before a Coastal Management Plan is adopted and/or implemented.

The State of Alaska is currently completing a Bristol Bay Resource Inventory. This inventory will fulfill baseline data requirements for the State's oil and gas leasing process, while at the same time begin the study phase work of the Coastal Resource Service Area Board once formed. The Resource Inventory will also serve the cross-purposes of the Bristol Bay Cooperative Management Plan mandated by the "Alaska National Interest Lands Conservation Act."

It should be noted that the initial funding for the Bristol Bay Resource Inventory was money earmarked for the Bristol Bay Coastal Resource Service Area Board. It was agreed amongst local groups that the completion of the Resource Inventory by the Department of Natural Resources will expediate the coastal planning efforts of the yet unformed Coastal Resource District Board.

Draft Supplement to FEIS: Five Year OCS Lease Schedule

The draft supplement to the final environmental Statement for the proposed 5 year OCS lease schedule addresses many of the concerns that have been expressed with regards to lease sales in the St. George Basin, the North Aleutian Basin and the Navarin Basin.

Two areas of special concern addressed in the supplement are a change in the leasing process and discussion of Impacts on Commercial fishing activities. Within the framework of the discussion concerning the Administrative framework, Page 4, line 13, sub-division of the planning areas is contingent upon several factors, amongst which is "special environmental concerns." There is no specific language dictating the appropriate classification or identification of special environmental concerns. Locally generated concerns and industry generated concerns are often time at lager-heads. Creating development incentives through the identification of a specific resource such as oil versus other marine resources begs conflict and resentment. Salmon and walrus are of no particular value to a concern involved with oil exploitation, but oil and gas are important to commercial salmon fishermen. It would seem that those with a more holistic approach to a particular eco-system would be best able to identify special environmental concerns!

As mentioned previously, there is no local expertise to digest the multitude of information and assess mitigative measures for possible resource conflicts. A more active federal effort to support both financially and with technical assistance would be most appropriate. This would not only lead to clearer information, but would offer the avenue for participation by entire communities circumscribed by proposed planning areas.

It is not hard to standardize information with the use of statistics and probability inference. Nor is it hard to be mis-guided by such planning and estimation methodologies. With the implementation of this new leasing procedure many non-quantifiable values will be moved from the protective hands of informed citizens and government to the paternalistic hands of industry. Nobody purposely harms another, but ignorance of the realities begs the question of procedure. Opening up entire planning areas and then seeking exemptions for specific sites seems to be relegating legitimate concerns for the natural order to a secondary status. In much of the Bush, natural processes are of primary concern out of a need for survival and existence.

Secondly, are concerns over the discussion about the fishermen's contingency fund for the North Aleutian Basin (P. 38). Not only will delays in funding such an insurance program result in lost fishing time, but it will also result in those results you spell out. What is not mentioned explicitly is the loss of income from gear loss and conflicts. This is especially critical for salmon fishermen. It only takes one or two tides to make a fishermen for the season. Due to the logistics of moving into and out of the fishing dis-

tricts, gear loss could mean loss of a total season. Unless, there is some monetary compensation for income lost then the discussion grossly underestimates the potential impacts of gear conflicts and more importantly oil spills.

As far as the actual schedule of lease sales goes Alternative #5 appears to be the most reasonable. Except for the inclusion of sale #70 (St. George Basin) and #'s 85/86 (Hope Basin) there will be no new leasing units incorporated into the federal OCS program. This schedule will not only minimize total impacts throughout the entire federal OCS holdings but also provides a reasonable time frame in which to assess the urgency and identity of the purposes and goals of the OCS Lands Act.

Alternative #5 will also provide the time necessary for local coastal management plans to be formulated and complimented. The delay or deletion of several identified sites in the OCS would also help mitigate some of the impacts anticipated from state and federal upland lease sales. From the point of view of complete social health, upland lease sales provide a much more palatable alternative.

Additionally, national and global equilibrium should have been achieved with regards to the demands and supply of oil and gas. Currently, it is a buyers market; this situation will probably not change much in the next five to ten years. Basic resource scarcity and competition with other energy fuelstocks, most notably conservation, have bolstered the American publics ability to advance economically. It has also provided a quiet buffer to the indeterminate acts of foreign governments and America's own foreign materials managers.

Conclusion

Adopt alternative schedule #5; additional delays or deletions should include sale #70 and sale #85/86. Provide continued funding to achieve the goals and purposes of the Coastal Zone Management Act and create special funding mechanisms to develop local expertise in OCS development planning and implementation.

Rural Alaska
Community Action Program, Inc.

August 7, 1981

Director
Bureau of Land Management (542)
Department of the Interior
18th and C Streets, N.W.
Washington, D.C. 20240

Dear Sir,

We are writing in regard to the proposed Five-Year OCS Oil and Gas Lease Sale Schedule January 1982 to December 1986. We must agree with the very vocal group that it is "too much, too fast and too different." Time is needed for the local communities that will be affected by your increased oil and gas lease sale schedule. The American Revolution rallied to the point of no taxation without representation. If the areas affected do not have an approved Coastal Zone Management Plan adopted, we submit that this plan will tax the local cities and village economies, cultures, habitats and ecosystems, subsistence activities, land use, traditions and families without allowing them a voice. Time will allow the people a chance to do some planning on something that is going to significantly impact their lives.

Oil and gas technology also needs time to respond effectively and efficiently to exploring in the arctic and sub-arctic waters of Alaska. To risk an oil spill to decrease oil importation is penny-wise and pound foolish. A reasonable approach would be to have the oil and gas companies show proven ability to develop these natural resources and then allow them to drill. It is not as if these natural resources would not be there five or ten years from now if they are there now.

A firm policy will need to be developed concerning requests by the oil and gas companies to extend their leases. In effect it will be cheaper for the oil and gas companies to buy up as much acreage as is possible and since they are limited by the number of oil rigs, crews and support services that they have, it will be difficult, if not impossible, to explore and develop all of these areas offered for sale in a timely manner. By throwing open all of this OCS acreage, it will be a buyer's market which will decrease the amount of money offered per lease or acre. Development of existing wells is already delayed. If the Department of Interior allows the oil companies to delay exploration or development, it would defeat the whole purpose of the increased acreage and sales.

The Outer Continental Shelf Lands Act Amendments of 1978, Public Law 95-372, 92 Stat. 629, September 18, 1978 (43 USC 1811-1817) Title III Offshore

Administration • P.O. Box 3-3908, Anchorage, Alaska 99501 • (907) 279-2511

Oil Spill Pollution Fund Sec. 303 provides for claims for economic loss. Sec. 302 provides that "the Secretary is authorized to promulgate regulations designating the person or persons who may obligste available money in the Fund for such purposes." We are interested in what these regulations will contain. The majority of the scheduled oil and gas leases will affect rural Alsska and in the event of an oil spill, subsistence users will need to be compensated. If the damage is lasting, it will affect the culture and a way of life.

More alarming to us is that a long range energy plan to decrease heavy dependence on oil and gas do not appear to be supported by the government. Alternate forms of energy need to be developed and utilized in order for this nation to become self-sustaining. Alaska is moving in this direction by incressing hydro-electric power. This, however, will only help the railbelt area of Alaska. Industry is realizing that more fuel efficient equipment and buildings are needed. Solar energy, wind power and other alternate forms of energy need funding for research.

Marine mammals, fish and crustaceans are important renewable resources that need protection from oil pollution and noise pollution. Research needs to be conducted to see what effect the drilling will have on them. This research should include effects of development of oil and gas should it be found and the effects of an oil spill.

If oil and/or gas is found, public input should be utilized in the placement of the pipeline and of the shore facilities. The Shetland Island fishermen complained that the contractor who laid the pipe was messy and was destructive to the ecosystem. They further complained that they are unable to fish in and around the pipeline and that the docking facilities have interfered with their shipping. Pollution from the refineries has also created a controversy. All of this will need to be dealt with prior to development.

It is important for the record to point out to you that while the acceleration of the OCS lease schedules foreshortens the amount of time that industry has to take getting on the "oil grounds", there is no compensating shortening of the time that industry has to hold these leases whose value shall likely be accelerating. Time <u>is</u> money, and the foreshortening, along with the concomitant slackening in environmental and social planning, while saving money, guarantees greater waste in pollution and lives. Such cost trade-offs may well be in the <u>national interest</u>. We leave that to greater minds, but it is not clear how it is in the national interest for industry to be able to hold the leases for the same amount of time as obtains under the original OCS schedule. It would seem to be in the national tradition that if you are going to, in effect, lower the basket at one end of the court, you ought to lower the basket at the other end too. <u>That</u> is the American Way. How will it be in the national interest to press greater impact on the lives of American citizens and not, somewhere along the line, impact the industries which, we are led to believe, exist at the service of the citizens of this nation?

Even with all of the activity and study that has surrounded, OCS from the standpoint of a local resident there are at least several glaring omissions in the OCS work to date:

First, the government, and its OCS office, is deficient in not presenting a menu of strategies for coast dwellers to deal with the impending increase in activity and population; and it is deficient too in the outlining of specific mitigating measures that federal government will insist upon to insure that the environment, and thereby the people, will be spared all but the absolute minimum disruption in their lives. In other words, despite all that has been done by the OCS office, government has really done nothing or little to reassure its citizens that their lives will be better for Exxon coming to their neighborhood. Alas, Exxon, for better or for worse is ultimately in business to make a profit; government is supposed to be in business to provide for the well-being of its citizens. The coastal communities need more and better assurance by the government that it is performing.

Second, the government via its OCS office has completely ignored the impact of OCS activities on communities away from the lease areas themselves. The major increases in population occuring in Alaska as a result of both the original and the accelerated lease schedule will take place in Cook Inlet and the railbelt area. Woe betide the subsistence fishermen and hunters who live on Cook Inlet or along Alaska roads and must compete for their daily bread with an Oklahoma roughneck and his family on a holiday.

Finally, as long as the government in its policies sustains the current oil and gas leasing methodology of confidentiality and proprietary information then the stage has been set; the curtain is always up on suspicion; and the Esaus living in Rural Alaska will and must remain ever fearful that Jacob is once more coming to purchase their subsistence birthrite, not with a mess of pottage this time, but with a mess of population and pollution.

The government and your Department could and should help alleviate these real fears of loss of livelihood and even fears of genocide itself by the Native people of Alaska. So far the government has done little that is apparent to even a discerning eye.

Pleaae make a greater effort to work for the rural people of Alaska.

Sincerely,

Jude Henzler
Director
Subsistence and Natural Resources Department

Rachel A. Ireton
Program Associate
Subsistence and Natural Resources Department

CHOGGIUNG LIMITED
P.O. BOX 247 • OILLINGHAM, ALASKA 99576 • PHONE (907) 842-5218

May 19, 1981

James Watt
Secretary of Interior
US Department of Interior
Washington, D.C. 20510

Dear Secretary Watt:

We cannot support your decision to speed up offshoure oil and gas leasing in Bristol Bay. The Bay's marine invironment supports tremendous renewable resource values. The potential impact on the miles of coastline is enormous. The villages in the region are not prepared for rapid changes. Regional and State government organizations have no presence in the area. We believe the risks involved in offshore development are too high when compared to the Bay's other marine resources. We support your plans to focus federal leasing efforts on upland basins.

Sincerely,

Trudy Ward

Trudy Ward
President

TW:lbt

cc: Sen. Stevens

ALASKA PUBLIC INTEREST RESEARCH GROUP
Post Office Box 1093/Anchorage, Alaska 99510/(907) 278-3661

August 3, 1981

Mr. Archie Melancon (542)
U. S. Department of the Interior
18th and C St. N.W.
Washington D.C. 20240

COMMENTS OF THE PROPOSED FIVE-YEAR OCS OIL AND GAS LEASING SCHEDULE

The proposed schedule offers a pace of leasing that outstrips industry's ability to efficiently explore and develop the leased resources (especially when considered in conjunction with increases in federal on-shore leasing programs). The pace allows little time for studying and understanding he impacts on the competing values affected by the leasing. The schedule therefore creates a tragically avoidable conflict with fish, wildlife, and traditional Alaskan values. It is a schedule which fails to take into account any concerns which arguably affect the extraction of oil and gas from OCS lands. Neither rational energy policy nor rational economic management of our OCS resources supports this dangerously superheated pace of leasing.

The pace of this schedule rests on two undemonstrated and unsupported assumptions: first, that federal leasing policy, even after the revised Carter schedule, serves as a supply constraint in the development of oil resources and second, that the new schedule will increase domestic oil and gas production and thus reduce our dependence on imported oil. In addition, the analysis supporting the schedule fails to adequately consider how the pace of the schedule and the selection of bidding methods affects the mandate of the OCS Lands Act as Amended "to insure the public a fair and equitable return on the resources of the OCS."

The underlying premise of the whole schedule is that federal management of the OCS poses an inherent constraint on the supply of leases and thus on the industry's ability to efficiently explore for and develop the nation's oil and gas resources. The schedule assumes that federal management is inherently inefficient because it does not allow industry to explore where it wants when it wants. In the name of efficiency, this schedule turns over to private hands the public's resources without regard to any other considerations that arguably affect industry's plan to develop those resources. This policy controverts the intent of the OCS Lands Act as Amended to balance energy development with the protection of the human, marine, and coastal environments and the provision of a fair and equitable return to the public on its resources.

The notion that federal offshore leasing policy serves as a supply constraint ignores the industry's limited resources (especially in the offshore sector) and the availability of alternative sources of "supply"--federal onshore lands. According to reports in the trade press, exploration in the offshore sector is already proceeding at such a pace that the industry now faces other supply constraints--shortages of skilled labor, unavailability of rigs and other supplies such as blow-out preventers, drill bits, pipe and casing.

The Oil and Gas Journal reports:

> "Offshore drilling activity is the busiest in history. And activity increase of the last 12 months will be topped by those in years to come .... operators, particularly in the U.S. Gulf Coast, have a substantial backlog of undrilled prospects ... Rigs are scarce .... There is a serious shortage of experienced personnel. The last year has been the worst on record for offshore accidents." (July 6, 1981, p. 123)

In addition, the so-called need to explore and develop OCS lands at this extreme pace which risks severe conflict with other values has not been evaluated in comparison to federal onshore lands or unexplored lands that the industry already has under lease. The only conceivable "analysis" of this aspect is industry's self-serving answers to the solicitation for comment on industry's ability to meet the schedule. The SEIS does not even entertain the possibility that drilling rigs will not be available in all areas (at p. 16).

If the concern is for quick access to high-potential areas, this goal does not require this drastic OCS schedule. It can be accomplished by considering for lease areas of high potential and low conflict with competing values, including onshore lands. While USGS's tract-by-tract evaluation may be no better or worse than any member of the industry, USGS is certainly capable of ranking general areas by their resource potential. The competing values could then be identified and industry's limited resources would then be devoted to those areas of low conflict.

A second major flawed assumption underlying the OCS schedule is the following statement: "It can be assumed that production from this schedule will replace some of the foreign oil and gas presently imported into the U.S." SEIS at p. 17; emphasis added. It is presumably the national interest embodied in this scenario, were it to be realized, that justifies the Department's decision to override the expression of concerns by states and concerned citizens. Yet nowhere is there a discussion of how this schedule moves us closer to the goal at an acceptable cost when compared with other schedules. In fact the discussion of alternatives in the SEIS only ranks them in terms of the relative speed of inventorying resources and assumed production and environmental impact. Nowhere is there discussion of the balance between the two--whether the benefits of the faster leasing alternatives are worth the risks or whether a slower pace would be fast enough in light of other impacts.

An assumption so critical to the selection of the proposed schedule should be supported by extensive analysis. Reviewing the current situation, however, casts doubt on this assumption.

The key to questioning this assumption is the widespread recognition that this schedule will cause lower bids compared to slower schedules, such as the Carter schedule. This is clearly recongnized in the Department's "fair value" analysis:

> " ... more leases, even if each is lower in price, mean more benefit to the national economy because they allow more efficient exploration and production of more oil and gas.
>
> In the example of the orange market, the value of oranges was decreased by increased supply. This does not mean that the high price in time of shortage was fair market value and that oranges in times of plenty sell for less than their fair market value. The analogy to the lease market is valid. Higher prices could be extracted for leases at lower leasing rates, but that does not mean that the lower prices that leases may bring at higher leasing rates represent less than fair market value. In both cases, the question of fair market value must be addressed by examining the structure of the market, not by examining the dollar value itself. Market value, and thus fair market value, is a function of the market supply conditions prevailing at the time of sale, which, in the OCS context are determined by the Federal government's leasing schedule. Regardless of whether those conditions create a glut or paucity of available leases, the high bids will always represent fair market value so long as the bidding systems and other policies maintain a lease market which is competitively structured and yields fair transactions."

The assumptions here are that the federal government has been interfering with efficient exploration for oil and gas by restrictive leasing policies, thus the new pace and the lower prices for leases represent a fair market value based on the efficient workings of the market.

However, there is no support for or analysis of the claim that the existing federal leasing policy, which is superseded by this schedule, has constrained exploration and development. The premise that this schedule represents a move to efficient exploration is unsubstantiated.

If the current lease market is in rough equilibrium (and the Department certainly has not proved the contrary), then the fall in lease "prices" which all recognize will occur indicates that the leases are being offered faster than industry can efficiently explore them. The lower lease "prices" also indicate that the bidders themselves do not anticipate a significantly increased rate of discoveries and production, because if they did, the value of their leases would be higher and prices would not fall.

A look at the facts involved in determining bids reveals why this pace will produce lower bids, indicating inefficient exploration. Those factors are 1) estimates of recoverable oil and gas 2) projections of the cost of extracting and marketing the oil and gas and 3) projections of the price of oil and gas.

The rate at which leases are sold will not affect the industry's projected price of the resource. Uncertainy over the recoverable oil and gas made available under the schedule is too great for a firm to significantly alter its price projections on the basis of possible discoveries from the OCS.

Therefore any change in bids must come as a result of one of three conditions, all of which indicate inefficiency in the pace of the leasing schedule. First, when leases are being offered faster than industry can gather adequate information due to constraints of time and money, the resulting uncertainty causes the projections of recoverable resources to drop. The inefficiency results from the inability to gather adequate information.

Second, the industry's projected cost of extracting the resource increases as a result of the schedule for several reasons. One, well-recognized, existing constraints on the supply of the industry's inputs mean the firm will have to bid more for these resources.

Two, by leasing areas before demonstrated technology exists to explore in those areas, the Department increases both the risk and the uncertainty involved in those areas. The uncertainty over the technology causes the cost estimates of operating there to be increased. And the uncertain technology causes the risk of incurring major costs (for lost rigs, oil spills and subsequent compensation, etc) to increase as well. The result is higher cost estimates which lower the estimate of the net value of the lease, causing lower bids.

A third major condition which reveals an inefficiency is simply industry's limited capital to devote to acquiring leases. Traditional cash bonus bidding with a one-sixth royalty is required on at least 40% of all OCS tracts offered each year. As the pool of leases offered each year on cash bonus bids expands, the industry's limited capital for acquisition is spread over more prospects, depressing average bids.

These inefficiencies are important to the fair value question. Accepting arguendo the Department's analysis of the fair value question, the Department has justified delegating itself extremely broad discretion with respect to the issue of return to the public in setting the lease schedule. That analysis basically says that, absent demonstrated collusion, any bid under any schedule or any conditions of information, uncertainty, risk, or timing of payments represents fair market value. Since the Department controls these factors in its selection of a schedule and bidding methods, the Department's analysis basically grants itself a blank check in its decision on a schedule and bidding methods. Without further justification, the resulting decisions would be arbitrary and capricious. Just because the value comes from a so-called fair market does not mean it is a good value, i.e. one that ensures an equitable return to the public based on efficient working of the industry.

The Department's actions directly or indirectly affect returns to the public in several ways, none of which are examined in the Department's fair market analysis. We have already mentioned how the pace of the schedule affects industry's ability to gather information on prospective leases and offer bids reflecting their estimated value.

Interior also can control information through practices such as on-structure drilling--in effect, contracting for exploration before leasing. This reduces the uncertainty to bidders, increasing the public's ability to capture rents on the resource. Reserving acreage in a sale area for later sale in the event of a discovery (drainage sales) also has the same effect.

The state of Alaska's sales of Prudhoe Bay leases offer an example of the dramatic effect of reduced uncertainty. The original Prudhoe Bay leases, accounting for 85% of the eventual reserves, were sold in the mid-to-late 1960's for $13 million. In 1969, after the initial discovery at Prudhoe, leases encompassing the remaining 15% of the reserves were sold for $962 million.

This accelerated pace of leasing reduces the returns to the public even more under cash bonus bidding than it does under contingency bidding methods which are authorized under the OCS Amendments. The Department's analysis does not distinguish between fair value to the public and fair value to the industry. Questions of a lease's value deal with anticipated revenue streams over time. Because industry and the government bear different risks and have different discount rates, the fair market value to the public is higher under contingency bidding systems (net profit share or royalty bid) than under cash bonus bidding for equal competitive conditions. The government's discount rate is lower because its available rate of return is lower than industry's. Individual bidders face higher risk than the

government (thus depressing bids) because the bidder faces the risk that her particular tract is dry, while the government bears only the much lower risk that all of its tracts are dry. The Congressional mandate to experiment with alternative systems was based on a recognition of factors such as these which the Department has so far ignored. Numerous studies in Alaska have shown that the present value of rents to the public is much higher under contingency bidding.*

The choice of contingency bidding methods is a choice between net profit share and royalty bidding methods. Though net profit share bidding is only slightly superior to royalty bidding in maximizing the present value of the public's income, it is far superior on other grounds.

It is widely recognized that the biggest disadvantage of royalty bidding is that royalties are functionally equivalent to a cost of production. High royalty bids therefore impose significant costs on production from a lease. For example, a royalty bid of 66% means that the cost of production must not exceed 34% of the value of production or the lessee will not develop or produce from the lease. High royalty bids therefore discourage the economic and physical recovery of the resources and orderly and efficient exploration and development. By creating the possibility that an otherwise economic deposit would be rendered uneconomic, royalty bidding also fails to protect the public's ownership interest in hydrocarbon resources. If the hydrocarbons could be economically produced (thus generating some income to the public) but they are not produced, the public's ownership interest is worthless.

It is true that royalties could be reduced or that sliding scale royalties could be established. However, royalty reductions substitute the judgments of administrators for the working of the market. They are also unfair to the unsuccessful bidders, since their bids may have been the highest consistent with economic development of the lease. Sliding scale royalties based on value of production are merely an approximation of the net profit share system. The Department should use the system which the sliding scale is designed to approximate.

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*Report of the House Interim Committee on Oil and Gas Leasing Policy, Alaska State Legislature, January 1980; Internal Analyses by Ed Phillips, Economist, Division of Minerals and Energy Management; The Beaufort Sea Oil Lease Sale: A Comparative Analysis of Different Bidding Systems, Tanzer Economic Associates, January 4, 1980; and State Petroleum Leasing Methods and Possible Alternatives, Energy Report #2-77, Department of Natural Resources, State of Alaska (Divison of Minerals and Energy Management, February 1977.

We urge the Department to use net profit share leases on at least 50% of the tracts offered each year and to use them on the tracts of the highest potential. The other innovative bid systems would then be used on the remaining 10% of tracts offered annually in order to meet the requirements of the OCS Lands Act as Amended that at least 40% of the tracts be offered on a cash bonus basis.

Representatives of the Department have stated in public hearings that the federal government is not a typical landowner due to factors such as national security, balance of payments, scope of ownership, etc. Yet the Department has done no analysis of how its decisions on the pace of the schedule and selection of bidding methods would be affected by these special factors beyond the most meager, unsubstantiated generalizations.

As one possible special factor, the Department's analysis anticipates that consumers will benefit from this leasing policy through the availability of more oil and gas at lower prices. However, the simplistic analogy to the "market for oranges" cannot support such a claim.

There are fundamental differences which destroy the usefulness of the analogy: the price of the resource the lease represents is largely determined independently of any market (by OPEC); leases are a resource with value that increases through time. Uncertainty over the recoverable oil and gas that will be made available as a result of this schedule is simply too great for a bidder to alter its price projections on the basis of discoveries from the OCS. The lower return on leases indicates an inefficiency, with no benefit to the consumer, at a cost to the public which owns the resource.

The tragedy of this accelerated leasing schedule is that its economic and environmental costs to the public, and to Alaska in particular, are not necessary. The so-called benefit of this schedule to our national energy situation addresses only the supply side of only one particular energy source--oil and gas. The critical problem is our economy's dependence on oil, regardless of its source.

The exclusive focus on production of oil only increases our dependence an expensive, environmentally risky energy source. This policy flies in the face of study after study which shows that more efficient use of energy together with a major emphasis on renewable resources, will end the "energy crisis" more quickly, at less cost, with less environmental damage--and will create more jobs.

A U.S. House Energy Committee report concluded that over the next 20 years, we can have a society in which more American workers are employed and are more productive, in which Americans travel more, have more housing and a greater per capita income, while reducing present energy consumption by 25%, with 20-30% of the remaining energy from renewable resources.*

The report of the Harvard Business School Energy Project and researchers in Alaska have made similar findings.**

(Citations on following page)

Conservation does not mean lowering employment or our standard of living. Its benefits are widely recognized, even by the oil industry, if not by the Reagan Administration. An editorial in the Oil and Gas Journal approvingly noted

> "Conservation saves money, reduces pollution, reduces oil imports, and buys time to develop alternative sources of energy that are environmentally benign, abundant, and socially acceptable." (May 4, 1981, p. 117)

In light of these considerations, there are viable alternatives to the schedule as currently planned, alternatives which offer a better reconciliation of the need to manage our domestic energy situation, both supply and demand, in a way consistent with potentially competing values.

We therefore urge dropping the North Aleutian Shelf and St. George Basin sales because the risks simply aren't worth the extremely low marginal benefit that the inclusion of these two sale areas offer under this schedule. We also urge postponing the Norton Sound, Navarin Basin, and Beaufort Sea Sales until there has been sufficient time to study the environmental impact and to develop technology to deal with the hazards of operating conditions there.

Sincerely,

ALASKA PUBLIC INTEREST RESEARCH GROUP

Matthew Zencey

Matthew Zencey
Research Assistant

* U.S. Congress, House Committee on Energy and Commerce, Report on Building a Sustainable Future, April 1981, Committee Print 97-K.

** Yergin, Daniel, and Robert Stobaugh, Editors, Energy Future: Report of the Energy Project at the Harvard Business School, (New York: Random House, 1979)

*Alaska State Legislature, House Power Alternatives Study Committee, Energy Alternatives for the Railbelt, August 1980.

Bering Sea
Fishermen's Association
805 West 3rd Avenue
Anchorage, Alaska 99501
(907) 279-6519

August 7, 1981

Director
Bureau of Land Management (542)
Department of the Interior
18th and C streets, Northwest
Washington, D.C. 20240

Re: Draft Supplement to the Final Environmental Statement: Proposed Five-Year OCS Oil and Gas Lease Sale Schedule- January 1982 to December 1986

Dear Director:

Bering Sea Fishermen's Association would once again like to present its position on the proposed five year OCS schedule- it is too much too fast.

Our renewable fishery resources in the Bering Sea are not worth the risk this schedule would put on them. At this point, even some oil companies have expressed doubt that the schedule can be met safely, what could be better proof of the recklessness of this schedule.

We have an individual salmon fishery in Bristol Bay which had an ex-vessel value of $120,000,000 in 1981 and this is only one of the many renewable resource biomasses that could be put into jeopardy unless more cautious approaches are taken off Western Alaska.

We can have both a fish industry and an oil industry in the Bering Sea. It only takes proper planning. Proper planning is not possible under the proposed schedule. We ask only that our fisheries are given the recognition they deserve.

Sincerely,

Mel Monsen

Mel Monsen
Fisheries Biologist

UNITED FISHERMEN OF ALASKA

MAILING ADDRESS & OFFICE
197 SOUTH FRANKLIN ST
JUNEAU, ALASKA 99801
907 586-2820

Rodger Painter
Executive Director

August 5, 1981

The Honorable James Watt
Secretary of the Interior
Interior Building
Washington, D.C. 20240

Dear Secretary Watt:

Are you really listening?

Since you're the trustee of the lands and waters belonging to the American public, we would hope so. Sitting some 5,000 miles from the nation's capital, though, Alaskans find it is often difficult to tell if anyone in Washington is hearing what we have to say.

The document entitled "Supplement to the Final Environmental Impact Statement--Proposed Five-year OCS Oil and Gas Lease Sale Schedule" exhibits a shocking disregard on the part of federal officials towards Alaska's most important renewable resource. The fishing industry is Alaska's largest private employer now and will provide thousands of new jobs to Americans as we ease the foreigners out of our offshore fisheries.

The importance of Alaska's fisheries resources extends far beyond mere economics, however, as the seafoods coming from the nutrient rich waters of the state's 34,000 miles of coastline are one of the world's greatest natural supplies of protein. Those fisheries will be feeding this hungry world as long as people need high quality protein.

Commercial fishermen are large consumers of petroleum products and we must have consistent supplies in order to operate our small businesses. While the United Fishermen of Alaska fully supports your laudable goal of achieving energy self sufficiency for the United States, we believe oil exploration in some of the OCS areas under consideration is premature.

Like the major oil companies who recently have expressed reservations over the pace of offshore development you have proposed, the UFA is concerned that one billion acres in five years is too much. The proposed schedule would offer 200 to 300 million acres for drilling each year, compared with 2.6 million in 1980.

What must be kept firmly in mind is that these areas offered for exploration contain other resources deserving of strong protection.

If the oil industry is pushed into too frantic a development pace, the chance of error is greatly increased. In addition, the areas under consideration won't receive adequate scrutiny because of the sheer volume offered each year.

In deciding where to trim back on the development schedule, the most logical area should be Alaska, since about two-thirds of the total acreage proposed for leasing lies off our coastline. The United Fishermen of Alaska requests you to remove at least the North Aleutian Basin (Bristol Bay) and St. George Basin offerings from the five-year plan.

We ask that exploration in these two areas be postponed for at least five years to allow the oil industry to develop better technology in other frontier areas with fewer conflicts, and to give the fishing industry and coastal communities time to better prepare for the inevitable impacts of large scale oil development.

These two areas have the largest concentrations of fishing activities of any of the lease sales under consideration and some of the largest fisheries resources in the world are located in those forbidding waters. Ports and harbors in these areas are non-existent essentially, and the surrounding coastal communities are unable to support the fishing industry already in place. To add large scale oil activity on top of the already severe infrastructure problems would be the poorest of planning.

Here's what your "supplemental" impact statement has to say about the potential conflicts on the important fishing grounds of Bristol Bay:

> "...This could substantially increase the effects on commercial fishing in the area by bringing oilfield activity into direct conflict with commercial fishing. It is impossible to tell at this time how many if any of the platforms or exploratory wells would be located close to or in the fishing areas. If any oilfield activity takes place in the important fishing areas, there will be, as in other OCS areas, a potential for gear loss from conflicts with seismic vessels, support vessels, exploratory drilling rigs, and platforms. Some of these impacts can be mitigated by the usual measures applied in other OCS areas, such as contingency funds, but until they are established and working efficiently, fishermen could lose part of a season from the inability to replace lost or damaged gear. Even with reimbursement from damages, replacement of gear will be difficult and fishing time will be lost."

What is lost in the impact statement is the importance of these fisheries. It fails to mention that the 2,600 salmon permits in Bristol Bay account for 26 percent of all commercial salmon gear licenses in the state and that the 1981 sockeye salmon harvest in the area was a staggering 160 million pounds. In addition to supporting the largest salmon runs in the world, Bristol Bay herring stocks are unparalleled: the 1981 harvest was 26.8 million pounds. The document also neglects to add that the St. George Basin area accounted for the bulk of Alaska's 1980

crab harvest of 186 million pounds. Little is said of the enormous amounts of bottomfish caught by foreign vessels in the area.

These are resources of tremendous national importance and potential impacts of oil development upon them should not be brushed aside so lightly. If large scale oil development is allowed, oil spills are inevitable because of the extreme environmental conditions: frequent winds of hurricane force, pack ice, earthquakes, tidal waves, incredible tidal action. Experience with relatively minor spills in Alaska has shown that present containment and cleanup technology is inadequate to cope with waves of more than five feet.

Fishermen know all too well that it is a rare winter day on the Bering Sea or Bristol Bay when seas are that calm.

These are our jobs and the livelihoods of our children and grandchildren that are at stake. While we would not attempt to argue that it is impossible for the oil potential of these waters to be tapped without destroying the fisheries resources, the UFA does contend that the proposed lease schedule pushes the oil industry beyond its current abilities. The search for new sources of domestic oil and gas should be focused on the more promising and environmentally sound uplands, rather than pushing the oil undustry to pour exploration money into offshore areas beyond the reach of existing technology.

Let Alaska's fishermen know that you are listening to their concerns by cutting out the two lease sales--Bristol Bay and St. George Basin--with the greatest potential for distrupting their fisheries.

Sincerely,

Rodger Painter
Executive Director

c.c. Esther Wunnicke
Senator Stevens
Senator Murkowski
Representative Young
Governor Hammond

Center for Environmental Education

1925 K Street, N.W • Washington, D.C. 20006 • 202 466-4996

August 10, 1981

Chief, Division of Offshore Resources
Bureau of Land Management (540)
Main Interior Building
18th and C Sts., NW
Washington, DC 20240

RE: Draft Supplemental Environmental Impact Statement on the Proposed Revision to the Five-Year Outer Continental Shelf Oil and Gas Lease Sale Schedule (46 FR 30706 and 32673-32674)

Dear Sir:

The Center for Environmental Education* wishes to take this opportunity to provide supplemental views on the Draft Supplemental Environmental Impact Statement (DSEIS) on the proposed revisions to the five-year outer continental shelf (OCS) oil and gas lease sale schedule. These written comments expand upon the oral testimony which the Center presented at the public hearing on the DSEIS on July 24, 1981 in Washington, DC.

We wish to incorporate by reference our comments upon the previous stages of the revision process. These previous comments include:

1) Our letter of February 2, 1981 responding to the call for comments on the June 1980 plan (45 FR 86559-86562).
2) Our letter of May 26, 1981 responding to a call for comments on the proposed revisions to the plan (46 FR 22468-22474).

The comments we are submitting today apply not only to the proposed program as set out on April 17 of this year and analyzed in the DSEIS, but also to the plan transmitted by the Secretary to Congress, the Governors of the affected coastal states, and the Attorney General on or about July 15 of this year. We note that our previous comments have not been incorporated to any extent in the July 15 plan.

Our comments will be structured as follows: We first place the revised plan in the context of national energy policy. We then discuss the requirements of the authorizing legislation--the Outer Continental Shelf Lands Act (OCSLA) as amended

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* The Center for Environmental Education is a non-profit, public organization with more than 350,000 supporters who believe in the maintenance of the biological diversity and ecosystem integrity of the seas, and use of marine resources consistent with sound ecological principles.

This is recycled paper

in 1978. We review the history of the leasing program and previous plans from 1954 through the present. We then analyze two of the basic assumptions of the revised plan and the DSEIS. We then discuss the adequacy of the discussions in the DSEIS regarding streamlining proposals. We then discuss other deficiencies in the DSEIS. We then conclude with a summary and recommendations.

Offshore Exploration as Part of National Energy Policy

As we stated in our oral testimony, the Reagan Administration seems to be pursuing offshore oil and gas almost exclusively as a means for decreasing the Nation's dependence on foreign oil. The Reagan Administration, we believe, is ignoring a number of factors in the current energy situation.

First of all, there seems to be a continuing assumption that the largest part of the Nation's undiscovered recoverable reserves of oil and gas is on the OCS. Yet, the most recent estimates of the U.S. Geological Survey (USGS) indicate that the OCS accounts for only 28% of the undiscovered natural gas reserves and only 34% of the undiscovered crude oil.

Rapid depletion of these finite reserves may help with our short-term energy needs, but will exacerbate our long-term energy outlook unless, of course, alternate forms of energy are pursued. The Reagan Administration appears to be ignoring a substantial source of energy production--conservation--as indicated by its severe cuts in the budgets of energy efficiency programs. As the Energy Project of the Harvard Business School concluded:

> If the United States were to make a serious commitment to conservation, it might well consume 30-40 percent less energy than it does, and still enjoy the same or an even higher standard of living. The saving would not hinge on a major technological breakthrough, and it would require only modest adjustments in the way people live. Moreover, the cost of conservation energy is very competitive with other energy sources. The possible energy savings would be the equivalent of the elimination of all imported oil--and then some. (Yergin, Daniel. "Conservation: the Key Energy Source," Energy Future. Random House, New York. 1979. pp.136-137)

Not only is the Reagan Administration failing to pursue this significant source of energy, but the DSEIS and the FEIS on the June 1980 plan only attempt to downplay the significance of conservation. Indeed, the rationale for accelerating the offshore leasing program is largely predicated upon ignoring conservation as a source of energy. We trust that the FSEIS will place the oil leasing program in the context of the Reagan Administration's overall approach to energy.

The Outer Continental Shelf Lands Act (OCSLA) (P.L. 95-372)

A primary mission of the OCSLA is the exploration, development and production of offshore reserves of energy. Congress, sensitive to the need to protect the environment and the need to provide for citizen participation also mandated that planning be coordinated with the states and balanced to reduce conflicts with other uses of the OCS and protect the Nation's coastal waters. Sections of the OCSLA addressing these issues include Section 18(a)1-3, 18(b)3, 18(f), 20(a-d) and 22(a-c). Unfortunately, the revised plan falls far short of achieving the balance mandated by Congress.

History of the OCS Leasing Program Demonstrates That the Revised Plan Will Not Significantly Increase Exploration of the OCS

A recent General Accounting Office (GAO) report ("Issues in Leasing Offshore Lands for Oil and Gas Development," March 26, 1981. EMD-81-59) investigated the history of the offshore leasing program. The GAO report notes the substantial recent increase in leasing:

> OCS leasing and development increased significantly during the 1970-80 period when compared to the preceding 16 years of the program. The number of sales increased by more than 50%, over twice as much land was offered for lease, the amount of land actually leased almost doubled and first time sales were held in 7 new OCS frontier areas. These increases were achieved during a time when sales were continuously delayed by lawsuits. (p. 1)

But as we noted in our comments on the April 17 Federal Register notice, leasing in frontier areas was very limited. According to the GAO:

> (L)easing goals have been further frustrated in that only a small fraction of the land in lease sale areas is eventually leased. Our (GAO's) analysis of the 10 lease sales held outside the Gulf of Mexico between 1975-80 showed that only about 3% of the land initially considered for lease (i.e. the call area) was eventually leased. By comparison, our analysis of four Gulf of Mexico sales during this time period...showed that only about 1% of the land in the call area was leased. Lack of industry interest, that is, industry either not nominating tracts to be included in a lease sale or not bidding on the tracts offered in a sale, accounted for over 72% of the reductions. (p. 45)

As the GAO notes, industry's unwillingness to nominate tracts affected the attainment of offshore leasing goals substantially (p. 31), and concludes that:

> (I)ndustry was interested in only a relatively small part of the OCS. The remainder apparently either was thought to have little resource potential or not economic to develop. (p. 47)

Even in those areas leased outside the Gulf of Mexico, the percentage of leased tracts which were actually explored was very low. The following table, adapted from Table 4, p. 23 of the GAO report, indicates this quite clearly:

Number of Tracts Leased and Drilled

	Leased	Drilled	% of Leased Tracts Drilled
1954-69			
Gulf of Mexico	1,223	922	75
Pacific	230	71	30
Subtotal	1,453	993	68
1970-79			
Gulf of Mexico	1,713	1,202	70
Pacific	110	19	17
Atlantic	238	23	9
Alaska	187	16	8
Subtotal	2,248	1,260	56
Regional totals			
Gulf of Mexico	2,936	2,124	72
Pacific	340	90	26
Atlantic	238	23	9
Alaska	187	16	8
TOTAL	3,701	2,253	60

Among other factors which might be responsible for this failure to explore frontier areas is the stesdy decline in resource estimates for these areas. As the GAO notes:

> These unopened areas were previously estimated to contain approximately 40% of the estimated undiscovered recoverable oil and gas resources believed to be contsined on OCS lands....According to...new estimates these unopened areas now represent about 13 percent of the undiscovered recoverable oil and gas on the OCS (p. 31)

No doubt other fsctors also contributed to this failure to explore frontier areas, and we shall discuss some of these later.

What is clear from this brief history of offshore leasing is that induatry has not been able to keep pace with even a gradual accelerstion in leasing. Since OCS exploration requires considerable plsnning and substantial capital outlay, the very fact that the 1970s saw five different leasing gosls and nine different schedules may have disrupted orderly development. The very unpredictability of the government's plans for the OCS seems to be frustrating the attainment of goals. Thus, what appears to be a basic assumption of the revised plsn--that OCS leasing and exploration can be accelerated rapidly--may actually frustrate exploration, if history is any indication.

Furthermore, the DSEIS makes another unsubstantiated assumption about planning for OCS exploration. On pages 6-7 of the DSEIS, it is stated:

> It was thought that States unfamiliar with OCS planning activities might need three-year spacing to avoid overloading on (sic) their capacity....All of these assumptions are now open to question.... States now have more experience with OCS plsnning activities so that overload should not be a problem.

Yet, nowhere in the DSEIS is Interior's assumption supported. A number of Governors expressed a very different point of viewin their comments on the April 17 Federal Register Notice. Much of the concern expressed by ststes was based on severe budget cuts in the Coastal Zone Management Program (CZMP) and the Cosstal Energy Impact Program (CEIP). It is incumbent on Interior to discuss the impact of these budget cuts on the states' ability to plan, and the effect this might have on the implementation of the revised leasing plan. To ignore this aspect of the plsn is to court litigation at a time when both states and industry are looking for predictability in the OCS leasing program.

In summary, the Nation's offshore leasing program has been undergoing a gradual evolution and acceleration. The DSEIS ignores the history of the program and makes unwarranted and unsubstantiated assumptions. The proposed plan promotes revolutionary change in the leasing program, which will be disruptive to planning by federal, state and local governments, and industry, and which will undoubtedly jeopardize attainment of national energy goals.

The Proposed Revised Plan is Impractical and Based Upon Dubious Assumptions Because It Does Not Recognize Significant Constraints on Industry

The DSEIS sets out a number of basic assumptions on p. 16 of the revised plan. We take issue with two of the assumptions:

1) All of the conditional mesn resources will be leased, discovered, developed snd produced.
2) A sufficient number of rigs will be available in each sale srea to allow for reasonable exploration snd development activity.

Our previous discussion of the history of the offshore leasing program provides strong evidence that the first assumption is groundless. Indeed, it seems to fly in the face of accumulating evidence. The second assumption is merely a subset of the first, and is equally groundless in light of past evidence.

However, there is now considerably more evidence demonstrating that the above two assumptions are dangerously removed from reality. First, a number of oil companies, in comments on the April 17 Federal Register Notice, indicated that the increased size and frequency of offerings will strsin snd dilute industry's capabilities. A number of states also questioned whether industry could respond, as did a number of other groups. Yet, no evidence is presented in the DSEIS to support the assumption that industry is any more capable of exploring vast areas of OCS than it was when much smaller areas were offered to it.

Second, a closer look at four factors essential to OCS exploration reveals significant constraints on the industry. Attached is a study by Richard Tinney, entitled Offshore Petroleum Exploration: Capabilities and Constraints. It is based on written information and interviews from industry and government sources. Below we summarize the results of this study:

1) Under the assumptions that 50% of all explorstory capital will go to OCS exploration (a highly optimistic assumption) and that the capital supply will rise 25% per year, the industry will experience severe capital shortfalls by 1984 under both the 20 million and 50 million acre scenarios set out in the April 17 Federal Register Notice (which, we assume, is still the same levels of leasing that DOI is considering). These findings are based on projected costs of seismic geophysical exploration (largely prelessing), OCS lease bonuses, and post-leasing exploratory drilling costs, and do not include costs such as pre-lease test wells.
2) Technological limitations are increasingly likely to constrain accelerated OCS development. Exploration will be occurring in greater depths, more seismically active areas, and under far worse weather and ice-loading conditions than exploration to date. Yet, industry has already demonstrated that its technology tends to lag behind needs, rather than anticipating them. Deepwater problems in the Beaufort Sea are expected during the five year period even under the 10 million acre scenario, and severe deepwater and sea ice problems will occur by 1983 in the 20 and 50 million acre scenarios.
3) Drilling rigs are now in short supply, and will not meet demand except in shallower areas of the Gulf of Mexico for a brief period about midway in the five years. Under accelerated lease schedule scenarios, the shortfall of drill rigs, especially in deeper waters and in frontier areas, will become severely constraining. Other kinds of equipment, such as blowout preventers, could be serious problems as well.
4) The oil and gas industry is unable to maintain sufficient numbers trained personnel even under the present lease schedule, and shortages will become much more severe under accelerated schedules. Expanded hiring will decrease experience levels, resulting in increased accident rates, hence increased risk to worker safety and the environment.

Quite simply, the revised leasing plan fails to take these important constraints into consideration, and, as a result, the plan is not build for success. The evidence contradicts the assumptions of the DSEIS mentioned above. If DOI wishes to advance the same assumptions in the FSEIS, some support for them would be most helpful.

We suggest that a reasoned plan for the leasing of offshore lands would take into account, at the very least:

1) that there sre numerous limitations to the speed with which equipment can be manufactured and personnel can gain necessary training and experience. Both high and low demand destabilize the manufacture of equipment and maintenance of a highly trained workforce. Gradual expansion allows for the proper allocation of manufacturing and training efforts by a broader segment of the offshore industry.
2) and that while technology may prosper from challenges, it cannot be relied upon to meet technological problems of considerable magnitude on demand. Premature application of largely untested technology involves potentially sizeable environmental costs. As in the history of exploration of the Gulf of Mexico, exploration of deeper waters or more hazardous areas should proceed only after technology has been tested thoroughly under less stressful conditions.

We believe that these principles are sounder than the DOI assumptions discussed above, because they are based on analysis of past performance and reasonable expectations of the future, which provide far more realistic assessment of industry's capabilities.

Indeed, the proposed revision to the five-year plan will only exacerbate the shortages we have identified. Together with the legal and planning challenges which the revision ignores, industry's limited capabilities seriously undermine the practicality of the proposed revision.

The DSEIS Fails to Fulfill the Requirements of NEPA to Discuss Regulatory Changes

The DSEIS focuses exclusively upon the scheduling of lease sales. However, integral to the proposed revision are proposals to streamline the leasing process. According to the National Environmental Policy Act (NEPA)(40 C.F.R. 1502.9(c)(2)), the DSEIS must also discuss these streamlining proposals and present alternatives. The DSEIS faisl to do this. Below, we discuss a number of these proposals.

1) Areawide offerings: The DSEIS does not analyze the environmental and other impacts which might result from areawide offerings, as required by NEPA. Nowhere is the ability or lack thereof of the DOI to gather environmental information necessary for the assessment of geohazards and for oil spill trajectory analysis over such vast areas discussed. Nowhere are mitigative measures which the DOI might take discussed. The DSEIS does not discuss how the DOI proposes to monitor operations in tracts scattered across thousands of miles of ocean. And, nowhere does the DSEIS fully analyze the impacts of areawide offerings in the abilities of states and industry to plan and focus their resources. Indeed, as the history of the leasing program demonstrates, industry is better served by offering quality acrege than quantity. This conclusion appears in a number of industry comments on the April 17 Federal Register Notice.

To summarize, the DSEIS fails to analyze the impacts of areawide offerings even marginally, and is therefore not in complaince with NEPA.

2) Elimination of tract selection: The DSEIS does not discuss the environmental and planning impacts of eliminating tract selection from the leasing process.

Once sgain, NEPA requires that such procedural changes in the program be analyzed and alternatives evaluated. Tract selection has provided a menas of focusing governmental snd industry resources on the evaluation of the hydrocarbon resources and environmental values of areas proposed for leasing. The DSEIS does not discuss the government's capability to evaluate the environmental impacts of leasing over very large areas. This concern is even greater in light of the substantial cuts in the Bureau of Land Management's (BLM) OCS environmental studies program and in EPA drilling effluents research. As the OCSLA requires a balancing between resource development and environmental protection, the elimination of tract selection, which would allow the BLM to focus its environmental studies program at a time when the BLM's capabilities will be much reduced, needs careful analysis. Instead, the DSEIS presents only conclusory statements concerning the problems which the proposal presents

3) Tiering of NEPA Documents: The DSEIS does not analyze this procedural change in the program nor does it evaluate, or even present, alternatives. We wish to incorporate by reference our comments on this matter presented in our letter of May 26, 1981 regarding the April 17, 1981 Federal Register Notice. In summary, the use of tiered EISs is inappropriate as proposed by the DOI and conflicts with Council on Environmental Quality regulations (40 C.F.R. 1502.20 and 1502.28).

The DSEIS Fails To Discuss the Environmental Impacts of the New Schedule in Any Meaningful Manner

The discussion in the DSEIS about the environmental effects of speeding up the schedule and offering larger areas for lease is seriously deficient. The DSEIS does nothing more than state that the impacts will be greater. Nowhere in the DSEIS is there discussion of how much greater these impacts might be. Less vagueness should certainly be demanded of a plan which expects to so substantially accelerate the leasing program over the June 1980 plan.

As note before, the DSEIS does not take into account budget cuts in the environmental studies program of BLM and in EPA research. The DOI is not only ignoring broad public concern and the specific mandate of the OCSLA to balance resource development with environmental protection, but the DOI also seems to studiously ignore a number of the findings and recommendations of the Committee on Assessment of Safety of OCS Activities of the National Research Council (NRC), whose membership hardly reflected an environmental bias.

First, the revised plan ignores the imperfect scientific understanding of the effects of offshore drilling and simply makes gensrsl statements about oil spills and the Gulf of Mexico. On page 66 of the NRC report (Safety and Offshore Oil, 1981), the following summary of our understanding of the effects of offshore drilling appears.

> Scientists agree that petroleum spills and discharges of high concentration produce an adverse effect on marine biota. There is no clear agreement among ocean biologists as to whether low concentrations of petroleum or drilling fluids produce significant effects on marine biota. Nor is there agreement about the cumulative effects of low levels of discharges or of disturbances caused by drilling operations to natural ecosystems, both being difficult to detect and measure quantitatively. Moreover, the long-term effect of the discharges on an ecosystem or community has not been established adequately. Thus, while there is general agreement that the toxicity and smothering effects of large quantities of oil and drilling fluids and cuttings are harmful to pelagic birds, benthic organisms and coral reefs, there is less agreement on the ability of those life forms to recover after a time.

Furthermore, the DOI does not seeming willing to consider the limitations of federal regulations to control the impact of chronic discharges. In its report the NRC remarks on page 76:

> Most regulations focus only on limiting the concentration of effluents. Only the ocean discharge criteria limit the quantity and rate of discharges. The regulations also do not set specific standards for mixing zones. The consequences of this are that variable burdens can be imposed on ecosystems without consideration of the overall effects on those systems.

Nor does the DSEIS discuss the implications for adequate environmental protection which arise from the variable implementation of these regulations. In this connection, the NRC report remarks on page 76:

> The Environmental Protection Agency, the Bureau of Land Management, and U.S. Geological Survey regulations allow for variability among sites and may be adjusted to address special site sensitivities at the discretion of the regional supervisor of the regulatory agency. However, the standards for varying regulatory or permit conditions are often not stated with specificity and are left to the discretion of the regulator involved....Often the application of variation hinges on post-lease sale or post-permit surveys or studies, rather than on identification of the special needs including studies of potential effects, before sale or permit issuance. By structuring flexibility as a post-sale or post-permit process, the regulations introduce uncertainty into the operations and the conditions imposed on them. This creates a difficult planning environment for the companies and for those concerned with potential pollution. It may mean that damage will already have occurred before conditions are imposed. It may also create an agency disincentive for adjusting the regulations post-sale or post-permit.

Finally, the proposed revision to the plan, together with the budge reductions in BLM and EPA environmental studies, will only aggravate a situation upon which the NRC commented on page 76:

> Without a sound scientific basis for decision-making about environmental effects, it is not possible to conclude whether the technology now in use to control discharges provides or does not provide adquately for the safety of OCS operations. The leasing program of the Department of the Interior is not structured to establish that scientific basis in a timely fashion.

If the DSEIS is to be a meaningful tool for assessing the risks of leasing the OCS for exploration and production of hydrocarbons and for striking a balance between exploration and protection, as mandated by the OCSLA, the discussion of the impacts of the accelerated program should include the issues set out above. There is no attempt in the DSEIS to assess the considerable risks of uncertainty. Otherwise, one must assume that offshore exploration operates in a scientific and governmental vacuum. Clearly, no such assumption should be made, if the OCSLA is any guide.

Other Deficiencies in the DSEIS

There are a variety of other deficiencies in the DSEIS, some of which we discuss below:

1) Regional Risks: Under Section 18(a)2(B) of the OCSLA, the offshore leasing program must insure "an equitable sharing of developmental benefits and environmental risks among the various regions." The DSEIS acknowledges that the Preferred Alternative would impact some areas substantially more than others. Impacts on coastal ecosystems, shipping corridors, fishery resources, sensitive habitat for endangered species, and subsistence cultures in Alaska are all expected to be severe. The most significant increases in impacts will occur in Alaska where there is little OCS activity. The increased potential for oil spills will most severely impact coastal ecosystems in California, the Bering Sea (a veritable marine "breadbasket") and the Arctic Sea (DSEIS p. 17).

Clearly, this skewing of risks toward Alaska and California violates the OCSLA in this respect. The DSEIS is deficient in not providing a discussion of mitigation measures and alternatives to such an obvious imbalance of environmental and safety risks.

2) Transportation and Refining Capacity: The DSEIS indicates that "transportation systems presently used to move crude oil around the Continental U.S. and from Alaska have to be substantially altered" (DSEIS p. 17). Table II-3 (DSEIS p. 15) provides an overview of the increased traffic which Pacific shipping lanes will be asked to absorb. The West coast is identified as the destination of products from 13 out of 17 areas. Nowhere does the DSEIS propose measures to accomodate this huge increase in tanker and support traffic.

Also, the DSEIS does not examine the effect of leases and resulting exploratory or production operations being scattered over the large planning areas. How will such a potential situation be dealt with? How will such a situation change the mix between tankering and use of pipelines in the movement of hydrocarbons from offshore areas? What will be the different environmental impacts of different mixes of transportation of hydrocarbons?

Furthermore, the DSEIS gives little consideration to West coast refining capacity. The DSEIS states that it is premature to attempt to determine the effects of the proposed accelerated plan on refining capacity. It then goes on to assume, without any supporting evidence, that refineries "should" be able to absorb the flood of oil, if there

3) Competing Uses: The DSEIS does not adequately evaluate the impact of the accelerated program upon major fisheries, particularly in Alaskan and Atlantic waters. In our view, it is simply not enough to say that the impacts will be greater, and leave it at that, particularly in light of budget cuts in environmental studies programs. The OCSLA does not contemplate the kind of after-the-fact protection of the environment and fisheries which the revised plan contemplates.

Conclusions

It is clear from the DSEIS that the revised five-year offshore oil and gas leasing plan is intended to make a break with the past. Undeniably, the history of Federal OCS involvement has been less than ideal for any of the affected interests--state and local governments, advocates for a clean, healthy and economically productive marine environment, the industry that finds, produces and distributes our Nation's offshore energy, and the millions of oil and gas consumers. All too often, states have felt trampled by the Federal behemoth; environmentally concerned citizens and scientists have been ignored by federal officials charged with protecting living marine resources; industry has sustained huge costs as the Federal government has repeatedly changed the planning environment; and consumers have nervously eyed their fuel supplies while the Federal government has only lately pursued solar power and energy efficiency programs. Yet, throughout the last several administrations, especially with the help of strong Congressional mandates, a process steadily evolved in which federal agencies were forced to work with these disparate interests towards achievement of balanced development of public lands on the OCS and improved regulation of industry activities. Now, amid speeches about states rights and restoring "balance," the Reagan Administration has revealed its new OCS energy program.

We say the following, after considerable analysis and introspection, with sincere and profound concern. Rather than a new step in an evolving program, the proposed revised plan is a revolutionary blueprint which, by studiously ignoring the lessons of the past and the constraints of the future, threatens our environment, our economy, and our national security.

In the future, as in the past, state and local governments will have to face not only the onshore impacts of offshore development but also the threat posed by offshore drilling to tourism, commercial fisheries, recreation, real estate values and wildlife. Now, at a time when the importance of comprehensive state and local planning will increase dramatically due to the revised plan, the Reagan Administration is seeking to gut the Coastal Zone Management Program and the Coastal Energy Impact Program. The Reagan Administration would have a greater chance of achieving offshore energy goals, were it to seek more, rather than less, involvement by state and local governments. The revised plan makes a travesty of the Administration's posturing about states' rights.

Furthermore, the revised plan shows a comparable disregard for the importance of maintaining the long-term diversity, stability and productivity of our Nation's coastal waters. A reasonable accelerated plan would also accelerate research on the consequences of offshore oil and gas activities. Instead, the Federal government is gutting the BLM's environmental studies program and EPA's drilling effluents research program. The Federal government apparently does not want decisionmakers, or anyone else for that matter, to know what the environmental costs of offshore exploration and development might be.

This radical departure from the previously evolving offshore program penalizes those companies which have placed their confidence in a predictable federal stewardship of the OCS. As the attached study demonstrates, the limited availability of capital, technology, equipment and personnel will exclude from participation in the OCS program all but the richest of the oil and gas companies. This contradicts the Interior Secretary's stated goal of increasing participation by smaller companies. In the end, these constraints render the revised plan unworkable.

By ignoring the lessons of the past and the constraints of the future, the revised plan courts unprecedented public backlash against the industry and the Federal government for stepping on the rights of states and localities, for needlessly degrading the marine environment, and for failing to deliver on promises of increased oil and gas availability. Such a backlash would only increase our Nation's vulnerability, because without a spectrum of sustainable alternative sources of energy, our Nation will become increasingly dependent upon offshore energy sources.

The DSEIS is virtually useless as an analytical tool. In producing the FSEIS, we hope that the DOI will incorporate this analysis and correct the repeated false assumptions and glaring omissions noted above. We are willing to work with the DOI in the pursuit of this most important national goal.

Sincerely,

Michael Weber
Marine Habitat Coordinator

Elliott A. Norse, Ph.D.
Director of Science and Policy

MW:EN:mw:en

NATIONAL WILDLIFE FEDERATION, 1412 Sixteenth Street, N.W., Washington, D.C. 20036 (202) 797-6842
Office of the Executive Vice President

October 22, 1981

Mr. Robert Burford, Director
Bureau of Land Management
U.S. Department of Interior
18th and C Streets, N.W.
Washington, D.C. 20240

Dear Mr. Burford:

The modifications announced in July to the April Draft Proposed 5-Year Lease Sale Schedule do not alter the views or recommendations expressed in the National Wildlife Federation's comments dated July 31, 1981. A copy of those comments which dealt with the Draft SEIS, but did not reference the July changes, is attached. The announced modifications do not alter the basic components of the proposal so our comments pertaining to the 5-Year Program have not changed. We do not see any movement to make the Proposal more environmentally acceptable.

Several revisions are being made in the analysis for the final supplemental environmental impact statement due to the recent U.S. Court of Appeals for the District of Columbia Circuit ruling on Secretary Andrus' 5-Year Leasing Program. The Federation believes that these changes should be issued in another draft proposal, rather than a final proposal as planned. This would allow more meaningful public comment and review of the changes.

Finally, it is our understanding that more cuts are being contemplated for the OCS Environmental Studies Program. At a time when this information is more critical than ever, the Department of Interior's actions in this matter are grossly inappropriate.

If you have any questions, please do not hesitate to contact us.

Sincerely,

Jay D. Hair

JAY D. HAIR
Executive Vice President

Enclosure

NATIONAL WILDLIFE FEDERATION
1412 Sixteenth Street, N.W., Washington, D.C. 20036 202—797-6800

August 4, 1981

Director
Bureau of Land Management
U.S. Department of the Interior
18th and C Streets, N.W.
Washington, D.C. 20240

Dear Sir:

Enclosed are the National Wildlife Federation's comments on the Department of the Interior's draft proposed 5-year OCS leasing schedule. Please put NWF on the mailing list to receive the FSEIS when it is released in late September.

If you have any questions regarding the comments made, please do not hesitate to ask.

Sincerely,

Bruce Leighty

Bruce Leighty

Sharon Newsome

Sharon Newsome
Resources Conservation Division

FRIENDS OF THE EARTH

August 5, 1981

Director (510)
Bureau of Land Management
U.S. Dept. of the Interior
18th and C Streets
Washington, D.C. 20240

Dear Director:

Attached are the comments of Friends of the Earth (FOE) on the Draft Supplement to the Final Environmental Statement, Proposed Five-Year OCS Oil and Gas Lease Sale Schedule. FOE hopes that you find these comments useful in correcting the serious flaws we have identified with the Draft Supplement.

In addition, we must re-emphasize our concerns with the federal OCS program. These concerns have been voiced several times to DOI, and we would refer you to the following documents which were submitted by us or on our behalf:

--Letter of December 7, 1978 from FOE/Alaska to Department of the Interior, re: OCS leasing schedule. 42 p.

--Letter of October 12, 1979 from Trustees for Alaska to Department of the Interior, re: comment on DEIS. 14 p.

--Letter of February 26, 1980 from FOE/Alaska to Department of the Interior, re: response to FEIS. 2 p.

--Letter of March 4, 1980 from NRDC to Department of the Interior, re: OCS schedule. 4 p.

--Brief for Petitioners, NRDC in State of California et al. v. Andrus et al., Nos. 80-1894, 80-1897, 80-1935 (D.C. Cir.)

--Letter of January 29, 1981 from FOE/Alaska to Department of the Interior, re: request for comments on 5-year OCS leasing Schedule. 3 p.

Please incorporate these as if by reference into these comments.

Alaska office, 1069 West Sixth Ave., Anchorage, Alaska 99501, (907) 272-7335

As you are probably well aware, the current 5-year leasing schedule and program (i.e., the program approved by then-Secretary Andrus in 1980) is being litigated by the States of Alaska and California who have been joined by local governments, Native groups, and environmental organizations. The reasons for contesting the "1980" program are many, and will not be repeated in detail here. It is enough to say that the proposed rate of leasing under this program seriously threatens nationally important social and environmental values. The accelerated, unbalanced approach to offshore development envisioned under the current program will make it extremely difficult to effectively monitor and regulate industry's activities. It will move industry into remote frontier areas prematurely, forcing them to rely on new and largely untested technologies. All of this serves to seriously jeopardize sensitive coastal areas and productive marine resources. It clearly fails to satisfy the balance required by the OCS Lands Act Amendments (OCSLAA).

If this is the case under the current program, the problems associated with the changes now being proposed by DOI are orders of magnitude greater. This proposal calls for offering virtually all of the OCS for lease in the next five years. As a consequence, oil exploration and development activities will be scattered over vast tracts of ocean. Thousands of miles of coastline will be threatened. Logistics problems will be extreme. Oil spill response capabilities, already marginal, will be stretched to the breaking point. Effective monitoring and regulation of industry activities will be virtually impossible.

Is this a responsible way to manage our nation's priceless marine resources? Obviously not. Section 18 of the OCS Lands Act Amendments (OCSLAA) explicitly calls for a balanced approach to OCS development. The need to develop offshore petroleum resources must be balanced with the equally important need to protect coastal communities and the marine environment. Neither the current "1980" OCS program nor the newly revised program now being proposed by DOI meet these requirements. FOE strongly urges the Department to reconsider the direction of the OCS program, and to design a leasing program which will ensure adequate protection of coastal communities, Native cultures, and the marine environment.

Thank you for considering our comments.

Sincerely,

David Benton

David Benton
Marine Resources Specialist

WHALE CENTER

August 7, 1981

Director,
Bureau of Land Management (542)
Department of the Interior
18th and C Streets N.W.
Washington, D.C. 20240

Dear Sir:

The Whale Center is a national whale conservation organization reaching some 6,000 people. One of our objectives is to monitor whale habitat. We have been a major participant in advancing the federal marine sanctuary program as well as reviewing and participating in most of the OCS oil and gas issues.

After reviewing the Draft Supplement to the Final Environmental Impact Statement on the Five-Year Offshore Oil and Gas Leasing Program, I submit the following comments.

These comments are essentially the same as those submitted on May 22 on the proposal to enlarge and accelerate the five-year OCS program. We can only continue to oppose the proposed revisions.

There is no program presented that will seek a balance between resource development and environmental protection as well as the effects on the coastal states. The revised plan is solely focused on economic interests with no attention to environmental protection.

Very valuable and fundamental economic activities like commercial fisheries are ignored in the haste to cater to the hydrocarbon industry.

The so-called streamlining only serves to accelerate oil and gas acitivity while eliminating early steps that provide the opportunity to reveal sensitive environmental concerns. This process undercuts the mandate of the OUter Continental Shelf Lands Act to explore, develop and produce, while also protecting public values in the marine and coastal ecosystems.

We repeat that our opposition includes our concern that important environmental information still will not be available in time for lease sale decisions. While there is ongoing research to try to discover answers to the impacts of spilled oil, increasing boat traffic and increasing noise on whales and other living resources of the marine environment, results will not be completed or evaluated before many of the sales are leased. This is not a sound basis for decisionmaking. It cannot possibly provide for recognition of the true costs of oil and gas activity in the OCS.

We are not convinced that the oil industry has the capability to exploit the new opportunities being given them. In fact, most of the companies have already commented that they have inadequate funds, trained personnel, and equipment to move ahead as quickly as the new plan provides.

The haste will be a burden to all concerned: the relevant government agencies, the industry, the public, and will certainly be a disservice to the environment.

Further, the new budget reduces funding the the OCS Environmental Studies Program, making the acquisition of the necessary basic information even more uncertain and delayed.

The Draft Supplement includes no discussion of the program and procedural modifications these revisions would bring about. This failure appears to be contrary to the requirement of the National Environmental Protection Act that analysis of such procedural changes be included in an environemtal impact statement.

Since only a general statement will be issued on the first sale with additions for subsequent sales, there is no provision for review of environmental impact on a site-specific basis. Elimination of the opportunity and time to review potential harm expected in specific areas will mean that special, unique habitats will be unaccounted for, that the needs of species in particularly areas will not be addressed.

As we have stated many times, no agency of government is considering the cumulative impact on migratory species from oil and gas activity that will surely result in rigs dotting the entire coastline of western North America. The entire range of the gray whale is along this coastal strip, including Canada and Mexico. Those two countries may well be planning their own OCS activity. The cumulative impact must be addressed. There must be provision for consultation among many agencies, with two other countries, and there is need for research and analysis into the cumulative effect. This is not provided for, and this lack is a defect of the greatest magnitude. We believe that it is contrary to the requirements of NEPA not to institute a program for consideration of cumulative effects.

Both the proposed changes of the Five-Year Leasing Program and the Draft Supplement to the Final Environmental Impact Statement are deficient, biased toward exploitation, bereft of environmental concern, and contrary to NEPA and the requirements of OCSLA.

Sincerely yours,

Maxine McCloskey,
Executive Director

(415) 654-6621 ~ 3929 Piedmont Avenue, Oakland, California 94611

Defenders OF WILDLIFE

July 24, 1981

Mr. Robert F. Burford
Director
Bureau of Land Management
U.S. Department of the Interior
18th and C Streets, N.W.
Washington, D.C. 20240

Re: Draft Supplement to the Final Environmental Statement, Proposed Five-Year OCS Oil and Gas Lease Sale Schedule (January 1982 - December 1986).

Dear Mr. Burford:

In response to the above-referenced document, Defenders of Wildlife (Defenders) submits the following brief comments. Defenders also incorporates by reference its comments submitted on May 22, 1981, in response to the "Request for Information on Proposed Changes in Offshore Leasing Program" (46 Federal Register, No. 74, page 22468, April 17, 1981).

As noted in those earlier comments, Defenders believes that, while the Department's proposals to expedite OCS production may be "well-intentioned and necessary," this objective may not be accomplished in a manner which fails to comply with the mandates of either the National Environmental Policy Act (NEPA) or the Outer Continental Shelf Lands Act Amendments of 1978 (OCSLAA). Moreover, many industry representatives, as well as conservation organizations and concerned coastal state governments and agencies, have uniformly indicated opposition to basinwide leasing and areawide resource and environmental assessments, which are currently being proposed as "streamlining" procedures. Defenders continues to firmly believe that the administrative procedures implemented in the currently existing schedule must be followed in any extended or expanded leasing schedule. Inasmuch as the Draft Supplement incorporates the principles and proposals advocated by the April 17 outline, Defenders objects to "Alternative 1: The Proposal." This objection is stated for the very same reasons as were discussed in Defenders' earlier comments -- principally that such proposal does not meet the legal requirements of the OCSLAA or of the NEPA.

1244 NINETEENTH STREET, NW • WASHINGTON, DC 20036 • (202) 659-9510

Specifically, Defenders reiterates that the proposed expedited schedule will not allow the balancing required by the OCSLAA, at Sections 18(a)(1) and (2):

> ...[Such] leasing program shall be prepared and maintined in a manner consistent with the following principles:
> (1) Management of the Outer Continental Shelf shall be conducted in a manner which considers economic, social, and environmental values of the renewable and nonrenewable resources contained in the Outer Continental Shelf, and the potential impact of oil and gas exploration on other resource values of the Outer Continental Shelf and the marine, and human environments.
> (2) Timing and location of exploration, development and production of oil and gas among the oil and gas-bearing physiographic regions of the Outer Continental Shelf shall be based on a consideration of -
> (A) existing information concerning the geographical, geological, and ecological charasteristics of such regions;
> (B) an equitable sharing of development benefits and environmental risks among the various regions;
> (C) the location of such regions with respect to, and the relative needs of, regional and national energy markets;
> (D) the location of such regions with respect to other uses of the sea and seabed, including fisheries, navigation, existing or proposed sealanes, potential sites of deepwater ports, and other anticipated uses of the resources and space of the Outer Continental Shelf;
> (E) the interest of potential oil and gas producers in the development of oil and gas resources as indicated by exploration or nomination;

(F) laws, goals, and policies of affected States which have been specifically identified by the Governors of such States as relevant matters for the Secretary's consideration;
(G) the relative environmental sensitivity and marine productivity of different areas of the Outer Continental Shelf; and
(H) relevant environmental and predictive information for different areas of the Outer Continental Shelf.

and, at §18(a)(3):

> "...to the maximum extent practicable,...a proper balance [shall be achieved] between the potential for environmental damage, the potential for the discovery of oil and gas, and the potential for the adverse impact on the coastal zone."

The opposition noted earlier to basinwide leasing and areawide resource and environmental assessments has been particularly applicable with respect to frontier areas where much less is known about both the potential resources and the geophysical and environmental risks involved. In many instances, industry representatives have indicated they simply will not be able to comply with the proposed expedited schedule, due to equipment and trained personnel shortages.

The physical areas of primary concern are, of course, those located off Alaska's coastlines. From the beginning of the NEPA process undertaken to develop a five-year OCS leasing schedule, the State of Alaska has consistently expressed strong concerns over leasing in certain areas, absent requisite environmental, geophysical, and technological data. Among those areas are the North Aleutian Shelf, St. George Basin, Chukchi Sea, and portions of the Beaufort Sea. It is significant that Alaska has also expressed the belief that Norton Basin and Kodiak would be acceptable areas for leasing between 1983 and 1985, pending the development of advanced exploration and drilling techniques, transportation methods, and mitigation measures.*

* Summary of Issues (Section V), Final Environmental Statement: Proposed Five-Year OCS Oil and Gas Lease Sale Schedule (March 1980 - February 1985), Bureau of Land Management, pp. 353-384.

In response to Alaska's concerns, the Department added to the FES an Alternative 9, which was to "Hold 28 Lease Sales Omitting the Northern Aleutian Shelf, St. George Basin, and Chukchi Sea; Omit Portions of the Beaufort Sea; Delay Sales in Kodiak and Norton Basin; and Add a Sale in Hope Basin."* As you know, this Alternative was not adopted as a part of the Final Schedule approved by former Secretary of the Interior Andrus. Issuance of the Department's current proposals to further accelerate leasing activities, particularly in frontier areas, has evoked the following from Alaska's Governor, Jay S. Hammond:

> "The State of Alaska has repeatedly expressed serious concerns regarding the current federal OCS leasing program for the period 1980-1985. Your draft proposed leasing program which places greater emphasis on early entry into frontier areas of high risk in the Alaska OCS region represents a dramatic departure from the current leasing schedule and does very little to accommodate the legitimate concerns of the State of Alaska.
>
> "The State of Alaska is firmly opposed to both the magnitude and pace of leasing proposed for the Alaska OCS region in your draft program. Alaskans are being asked to shoulder an inequitable portion of the risks and impacts inherent in oil and gas activities conducted in hazardous offshore waters.
>
> "...the local communities of coastal Alaska are overwhelmed by the proposed acceleration of OCS leasing in their regions. In addition to a virtually unanimous request for delay of specific OCS sales, the local communities and regional organizations expressed serious concerns about the lack of environmental information in specific areas, the lack of sufficient time to complete their local coastal planning before oil and gas activities commence, and the threat that these activities pose to their subsistence and commercial livelihoods.
>
> "The views of Alaskan residents, who are being forced to assume an inordinate share of the risks and impacts from OCS activities, should be heard."**
>
> [Emphasis added.]

* Ibid., p.87

** Letter to Hon. James G. Watt from Hon. Jay S. Hammond, Governor, State of Alaska, May 22, 1981.

Alaska's proposals, while obviously of immediate importance to its residents, should not be construed by the Department as merely narrow State interests. The delay or deletion of certain, not all, Alaskan OCS areas from the leasing schedule reflects eminently good sense on a variety of grounds, including lack of industry capability, unknown potential resources, and high (but unquantified) environmental and geohazards risks. Such risks, it must be remembered, are not solely and separately posed to marine species, but are in a larger sense posed to the commercial livelihoods of coastal residents and native peoples. The Department has proclaimed many times its desire and intention to conduct a more efficient OCS leasing program. This objective can not be accomplished if leasing activities are conducted on less than firm bases of knowledge and capability. In the case of Alaska especially, these bases do not presently exist. Because it makes abundantly good sense not to proceed into unknown areas until these data are available, the State's arguments in support of its position are good ones, and should be heeded by the Department.

In addition, therefore, to its insistence that the procedures by which the current Schedule proceeds must be continued, Defenders also supports strongly the concept behind the Supplement's Alternative 5: "Delete and Delay Alaska Sales." For the reasons mentioned above and the discussion following, Defenders advocates not proceeding with drilling operations in certain specified Alaskan areas.

Defenders expresses particular concern about the Bureau's acknowledged lack of quantified information on the potential effects of hydrocarbon operations upon Alaska's marine species. Although little is known about the adverse effects of oil development upon marine species it is abundantly clear throughout the Supplement that there is significant cause for worry:

> "Sensitive areas and endangered species will be affected to a greater degree because of increased activity on the OCS, possibly affecting whales and marine mammals, and the greater possibility of oil spills coming in contact with coastline [sic] which are in themselves sensitive areas, or at one time or another to serve as habitat for endangered species or the prey of such species." (p. 18)

> "Not only would accelerated leasing in this area (North Aleutian Basin) increase impacts on waterfowl and commercial fish, but it would also possibly have an effect on marine mammals which migrate through the area, and the salmon upon which local native people depend." (p. 41)

> "Accelerating leasing in this area (St. George Basin) would increase the short-term statistical probabilities of oil spills. This would cause an increase in...adverse impacts...especially those on pelagic sea birds and the birds and seals inhabiting the Pribilof Islands with the next years...." (p. 41)

> "Like other Bering Sea planning areas, Norton Basin is the location of numerous very sensitive waterfowl, marine mammals and pelagic birds habitats and migration routes. Accelerating leasing and allowing exploratory wells and platforms to move into the area more quickly will increase the adverse impacts on those sensitive breeding grounds and feeding areas." (p. 41)

> "No new effects [on whales] should result from this proposed schedule, but the degree and probability of the impacts discussed will likely increase, especially in...Barrow Arch and Diapir Field where significant change is to be expected from the present schedule to this proposal. The degree of these changes cannot be quantified." [Emphasis added.] (p. 42)

> "Endangered whale species, particularly the bowhead whale, may be affected by accelerated and increased oil and gas activities planned in the proposed lease schedule. Two additional sale areas in the Diapir Field could have an increased cumulative effect on bowhead whales in their summer feeding areas and spring and fall migration corridors. ...along with oil development in the Canadian Beaufort, the present proposed Sale 71, and the joint

State and Federal sale areas will increase the risk of adverse effects on bowhead whales from oil pollution and human disturbance. The degree and significance of this is not known.

"Accelerated oil and gas activities in the Bering Sea, particularly in the western Norton Basin and in the Navarin Basin respectively could impact bowhead whales in their wintering habitat and affect other endangered whales such as fin whales, sei whales, and gray whales in their feeding habitat.

"Plans to accelerate OCS oil and gas activities in the Arctic and Northern Bering Sea must consider the possible conflicts with critical habitat of bowhead whales and other endangered species. Accelerated exploration beyond the present schedule of activity may not allow sufficient time to collect scientific data on the effects of such activities on endangered species in advance of the proposed activities. [Emphasis added.] (pp. 45-6)

"Adverse impacts could occur to endangered and threatened species of marine mammals and birds. ...the most substantial increases in impacts on these resources would come from a greater number of potential oil spills and disturbances by oilfield and support base operations, especially in...the Bering Sea and the Arctic Ocean." (p. 56)

"An irreversible commitment of wildlife habitat will be required, principally in Alaska." (p. 63)

Moreover, in light of the Department's "streamlining" proposals for the OCS leasing process, such site-specific information on these adverse effects will not be available prior to actual development.

The adoption of Alternative 5's concepts would significantly reduce some of the uncertainties noted above. The Supplement's analysis, in fact, argues in its favor:

"This alternative would allow more time for the collection of more extensive environmental

and socio-cultural data on the Alaska OCS and coastal zone, and it would also delay leasing until industry had more completely developed their deep and rough water technology and learned more about working in moving ice conditions." (p. 20)

"Cumulative impacts would be reduced in Norton Basin and St. George Basin as fewer sales would be held in each of the planning areas. Fewer sales would reduce the potential for oil spills and the possible impacts of such spills are [sic] marine mammals, pelagic birds and waterfowl on the islands within the areas, and an [sic] mainland Alaska areas around the Bering Sea. Impacts on migrating whale species should also be fewer then [sic] described in the proposal."

"Dropping two sales in the North Aleutian Basin would constitute a very significant change from the proposal as sales in this planning area have the greatest potential of adversely affecting important Alaska fisheries along with reducing the probable number of oil spills by 5.75. The dropping of the St. Matthew-Hall sale would further help reduce impacts on Bering Sea marine mammals, waterfowl, pelagic birds and commercial fisheries...." (p. 21)

With respect to increased OCS production, the Supplement concludes that:

"...alternatives 1, 3, and 6 offer the greatest opportunity to inventory OCS hydrocarbons resources and increase production quickly with Alternative 5 falling only slightly behind." (p. 24)

In summary, the entire Draft Supplement presents no more than a "guessing game" of resources to be recovered and adverse impacts to be sustained by marine and coastal communities. Indeed, the document can be no more than this, because of the numerous and variable unknowns involved. In all, any revised OCS lease schedule to be finally adopted begs for the more reasoned approach instituted in the 1980-1985 Schedule. The adoption of the preferred Alternative 1 will only invite delay, confusion, and frustration with little tangible progress in OCS production.

The Bureau would do well to maintain as a guiding principle the following:

"Man does not have a clear sense of the eternal; we are time-bound creatures with value measurements that are all too finite. Yet, a view of the coast that looks into the future is vital if we are to maintain its natural viability for even a generation more. Coastal resources are now under so much stress that such an effort will require quick and drastic change; as consumers of coastal amenities, we will have to reorient our approach from one of 'maximum use now' to one of protection and preservation. If the coast is to be saved for the use and enjoyment of man and wildlife, our attitudes toward the use of its shores and waters must change to reflect an appreciation of its values; the rich, continually evolving shorelines, the intricate processes that keep the system going, and above all, the fragility that makes the coast so vulnerable to stress and abuse.

"Ultimately, ...the coast belongs to everyone: its riches and resources as well as the responsibility for its well-being and preservation. The coast, with all its splendor, has existed on earth for many millions of years; we must not unduly tamper with this eternal system for the sake of present needs and our short-sighted vision."*

Sincerely,

Sherrard Coleman Foster

Sherrard Coleman Foster
Marine Issues Specialist

* "America's Coasts in the 80's: Policies and Issues," Jennie C. Myers, The Coastal Alliance, 1981, p. 158.

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Get Oil Out inc. P.O. Box 1513 924 Anacapa Street Santa Barbara California 93102 Phone (805) 965-1519

August 4, 1981

Edward L. Hastey, Director
Bureau of Land Management (542)
Department of Interior
18th and C Streets N.W.
Washington, D. C. 20240

Re: Accelerated Five-year Leasing Program DSEIS

Dear Mr. Hastey:

Get Oil Out Inc. (GOO), a citizens action group with nationwide membership, strongly opposes the accelerated five-year leasing program as presented in the Draft Supplement to the Environmental Impact Statement.

We believe that this program would ultimately result in the total exploitation of the nation's oil and gas resources. It should be noted that even the oil industry has expressed concern about this program and testified to that effect at hearings held on the DSEIS recently.

GOO opposes the accelerated program for the following reasons:

1. The emphasis on the program is volume of OCS acreage offered, not on the evaluation of promising acreage.

2. "Inventory of resources" is not authorized under the Outer Continental Shelf Lands Act Amendments of 1978 and is not warranted at this time.

3. The DSEIS and program discourage conservation and planning.

4. Leasing is increased 30 times but the DSEIS does not evaluate the impacts of such leasing.

5. The DSEIS was revised by Secretary of the Interior James Watt in a press release on July 15th. However, the actual revisions to the program were not released.

6. The size of the offerings in the OCS has been increased but exploration of the OCS by the oil industry will not increase.

7. "Need to reduce imports of oil" has been cited by Watt in the DSEIS as reason to accelerate leasing in the OCS. However, the recently released "National Energy Plan III" states,

> "Achieving a low level of U.S. oil imports at any cost is not a major criterion for the nation's energy security and economic health."

Thank you for this opportunity to comment on the DSEIS of the accelerated five-year OCS leasing program.

Respectfully,

Ellen Sidenberg

Ellen Sidenberg,
Executive Director

ES:es

PPPOA

PACIFIC PALISADES PROPERTY OWNERS ASSOCIATION, INC.
POST OFFICE BOX 617
PACIFIC PALISADES, CA 90272
(213) 454-4254

August 8, 1981

Pacific OCS Office,
Bureau of Land Management
1340 West 6th St., Rm 200
Los Angeles, CA 90017

Re: Proposed 5-year oil and gas lease sale schedule

Gentlemen:

We oppose the five-year sale lease as proposed. It not only slights environmental concerns; it gives insufficient attention to competing economic considerations.

The enclosed comments by one of our members and Directors have been reviewed by our Planning Committee and endorsed by the Board.

Yours very truly,

Rubell Helgeson

Rubell Helgeson

DEDICATED TO THE PRESERVATION OF THE RESIDENTIAL CHARACTER OF OUR COMMUNITY

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NATURAL RESOURCES COUNCIL OF MAINE
271 State Street Augusta, Maine 04330 207-622-3101

July 23, 1981

Director
Bureau of Land Management
Department of Interior
18th & L Streets, N.W.
Washington, D.C. 20240

Dear Director:

Please find enclosed the Natural Resources Council of Maine's comments on the Draft Supplement to the FEIS Proposed Five Year OCS Oil and Gas Lease Sale Schedule; January 1982 - December 1986.

Would you please put us on your mailing list for all follow-up documents regarding OCS activities?

Thank you very much.

Sincerely yours,

Jerry A. Bley
Education Coordinator

JAB:pln
Enclosure

THE NATURAL RESOURCES COUNCIL OF MAINE

Testimony to the U.S. Department of Interior on the Draft Supplement to the Final Environmental Statement Proposed Five-Year OCS Oil and Gas Lease Sale Schedule
January 1982 - December 1986

When former Interior Secretary Andrus, one year ago proposed his Five Year OCS Lease Sale Schedule calling for the sale of 75 million acres, it was considered an "aggressive" proposal by the oil industry and "dangerous" by conservation interests, citing the potential impacts of OCS drilling.

Now, just one year later, a year which has produced little change in our energy situation, a schedule ten times more "aggressive" and "dangerous" is being proposed. Associated policy changes increase the environmental risk of the proposal another magnitude of order.

The Natural Resources Council of Maine, the state's principal environmental organization, is absolutely opposed to the proposal presented by the Secretary of the Interior in the Draft Supplement to the FEIS for the Five Year OCS Oil and Gas Lease Sale Schedule.

Our concern is for the Georges Bank region in particular and the entire continental shelf in principle. We are confused and outraged by such a reckless proposal as this one which would virtually give away our entire continental shelf to development interests. The plan is not feasible from industry's point of view and is disasterous from a conservation viewpoint.

Our objections to the proposal and all of its alternatives, except for Alternative 3 (no action) concern all aspects of the proposals including: 1) acceleration of the leasing schedule; 2) expansion of lease areas; 3) critical area leasing; 4) the planning and environmental review process; and 5) the states' role.

A total of 42 million acres of OCS land have been leased since 1952. This proposal calls for the leasing of 200 million acres, five times this amount each year. It is difficult to believe that the oil companies could possibly gear up to this accellerated schedule. The American Petroleum Institute and most oil companies have themselves criticized the schedule readily admitting that they "could not respond effectively and efficiently to such offerings." *

There is currently more than 500 unexplored tracts from past lease sales. Why does D.O.I. want to accellerate future sales when industry hasn't even explored what they already own?

* Atlantic Richfield, from the Boston Globe, July 7, 1981.

The expanded leasing program makes a joke of environmental protection. The environmental assessment of such vast acreages in such a short period of time is far beyond the capabilities of the Department of Interior (or anyone for that matter). The proposal to write impact studies for entire planning areas ranging in size from nine to 160 million acres similarly has no basis in scientific reality. The intent is clear - not to allow environmental considerations to interfere with the leasing process.

The proposed system essentially provides for open basin leasing, ignoring the valuable fisheries, vital seabird and endangered marine mammal habitat, sensitive spawning regions, geologically hazardous zones, tourism and coastal considerations. This reckless approach to offshore drilling can and must not occur in sensitive regions such as Georges Bank where fishing and tourism provide the New England region with food and jobs.

The spacing of lease sales in frontier areas at two-year intervals does not permit the results of initial exploration to be factored into planning for subsequent sales. The accelleration and expansion of the lease program is unnecessary since past practice does not support the contention that large sales result in more leases and more drilling.

If current D.O.I. actions in California are representative of the new proposal, frontier areas and regions of critical environmental sensitivity will receive little attention. Clearly in the California situation, studies have shown that the environmental costs far outweigh the potential oil benefits of the 32 contested Santa Maria tracts and the Northern California lease areas.

On the Georges Bank, we are particularly concerned that future lease sales (#52 and #82) will occur before there has been an opportunity to find out the impact that drilling begun this summer is having on this sensitive and valuable region. The Interior Department has considered a three year montioring program necessary to safeguard the Georges Bank ecosystem, yet has planned to go ahead with future development after only one year. It just doesn't make sense.

The Coastal Zone Management Act provides for states, which have developed federally approved plans to exercise primary responsibility for coastal management. This proposal ignores the CZM Act and the states' voice in OCS development. Maine does not oppose offshore oil development. Yet Maine, along with most every coastal state, severely objects to ill conceived OCS development which will have disasterous ecological and economic impacts on its land and water resources.

The risks of oil spills and the uncertainty surrounding the environmental impact of drilling discharges require that we move ahead cautiously with OCS development. The short-sighted and one-sided proposal presented in the Draft Supplement is totally unacceptable. We must ensure the continued vitality of the ecologic, fishery and recreational resources, which can only be achieved through careful planning.

EXXON COMPANY, U.S.A.
POST OFFICE BOX 2180 • HOUSTON, TEXAS 77001

EXPLORATION DEPARTMENT

D. G. GARROTT
OPERATIONS MANAGER

August 6, 1981

Director
Bureau of Land Management (542)
Department of the Interior
18th & C Streets, N.W.
Washington, D.C. 20240

Dear Sir:

Exxon submits the following comments concerning the Draft Supplemental Environmental Impact Statement on the proposed 5-year OCS oil and gas lease sale schedule. These comments should be considered a further amplification of my testimony before the hearing on the Draft Supplement in Anchorage on July 22, 1981.

An EIS is frequently the only document available to local communities to indicate the potential outcomes from oil and gas leasing offshore. Therefore we believe it is of paramount importance that the EIS, which serves these communities as a planning tool, present all possible outcomes -- positive as well as negative. In addition, the statement should also indicate the relative likelihood of each impact.

The Supplement appears to thoroughly document all of the potentially adverse environmental affects that could possibly arise from the schedule and enlarged lease offerings proposed by the Department of Interior. However we believe the draft is unduly pessimistic and fails to present a balanced view of the impact the new schedule may have.

We recognize that the agency preparing an EIS is required to include a worst case analysis of the potential effects of the activity in question. However this document, while listing all the speculative, unrealistic and highly improbable negative possibilities, fails to describe the low probability or insignificance of their occurrence.

For instance, on page 37 the supplement concludes that the impact levels on fishermen of increased industry activity in the Gulf of Alaska will be "from moderate to high". Yet this area is one of the least prospective areas, rating no more than 3 exploration wells in the Summary of Activities table (Table II-3). Such a low level of industry activity cannot possibly have an appreciable effect on the fishing industry, much less "moderate to high". The supplement also says that, in this same South Alaska area, "adverse effects on gear and species from spills will occur sooner under the proposal". This is incorrect. The first South Alaska OCS area sale in this new schedule takes places 2-1/2 years later than in the June 1980 schedule.

In the discussion of unavoidable adverse impacts on coastal habitats (page 57), the five onshore facilities sites assumed for Alaska are presumed to result in the "unavoidable destruction of a significant amount of wildlife habitat". This statement ignores the fact that this construction would be undertaken using every precaution to minimize the impact on wildlife habitat. The statement also fails to recognize that each of these facilities would disturb less than two miles of coastline, in the context of Alaska's 34,000 miles of coastline. We believe the impact of these facilities is greatly overstated; this section should be rewritten to indicate the minimal effect this construction will have on Alaskan coastal habitats.

Exxon sees no reason why the beneficial effects of a proposed action should not also be given an equal hearing in any description of the environmental impacts of an activity, especially one as important as the schedule of offshore lease sales over the next five years. An acceleration of leasing of this magnitude will bring our oil and gas resources into the economy at a much faster rate, thereby reducing the nation's dependence on imported oil. The program will also more quickly furnish the nation with an inventory of its conventional energy resources, permitting us to begin effectively planning on energy alternates for the 1990's and beyond. Other socio-economic benefits, such as additional employment and supplemental personal income, are mentioned only in the briefest manner.

We also recommend that the final Supplement include the benefits that offshore oil and gas structures offer both man and the marine environment, such as refuge for fish and crustaceans sought by commercial interests and additional structure for marine organism growth which improves fishing in the area. The Supplement ignores the fact that the industry must reimburse fishermen for losses associated with lost gear or damage caused by exploration and production activities. Finally, mention should be made of the USGS regulations for OCS petroleum activities that require mitigating measures to prevent the fouling of fishing gear with petroleum development installations.

It is important that these benefits and mitigating measures be mentioned in order to keep the potentially adverse impacts on the commercial fishing interests in their proper perspective.

Throughout the Supplement, mention is made of potentially negative results which are speculative, unrealistic and highly improbable. Yet there is little accompanying language which clearly describes the low probability or insignificance of their occurrence. As a result, the public, unaware of the small likelihood or trivial consequence of some of the described events ever taking place, becomes confused and unduly opposed to lease sale activity. Potentially affected communities cannot make a reasonable assessment of what may actually occur. Thus rational planning becomes impossible; whatever planning takes place is based on the doomsday situations found in the environmental study.

Exxon believes that an environmental assessment, to be a useful planning tool, must present a balanced picture of potential results of industry activity. Worst case scenarios of severely adverse environmental results should be clearly and intimately linked with a description of their very low probability of occurrence. Documents such as these must make clear the fact that they describe a model of a possible situation, not an expected event.

Very truly yours,

D. G. Garrott

DGG:cw

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August 6, 1981

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Comments on Draft Supplement to the Final Environmental Statement--Proposed Five-Year OCS Oil and Gas Lease Sale Schedule, January, 1982 - December, 1986

Dear Sir:

The Alaska Oil and Gas Association (AOGA) is a trade association whose 36 member companies account for the bulk of oil and gas exploration, production and transporation activities in Alaska. Our membership includes the largest and some of the smallest petroleum firms in the industry. AOGA is the Alaska division of the Western Oil and Gas Association.

AOGA commends the BLM OCS Office and Secretary Watt for conceiving and proposing the revised OCS sale schedule and the streamlined leasing process. In past years, our Association has criticized the Interior Department strongly for witholding Federal lands from access for energy exploration in the face of dwindling reserves and increasing imports. The OCS program being proposed now is a much-needed reversal of past policy, and its significant benefits far outweigh potential disadvantages.

AOGA supports the proposed schedule and compliments the BLM on offering entire planning areas rather than tract-specific sales. This will enable development of OCS areas with the highest potential for oil and gas in an orderly and timely manner. In conjunction with the revised program, AOGA supports a maximum lease term of ten years, especially in Alaska, because of greater remoteness and climatic extremes.

We have reviewed the Draft Supplement and submit the comments contained herein for inclusion in the Final Supplement. General comments are provided below and specific comments have been typed directly on the attached copy of the Draft Supplement.

Critics of the proposed program have stated that the industry lacks the technological capability to operate in the Alaska OCS. This criticism comes from persons who are neither responsible for nor knowledgeable about the development and application of offshore technology. If the size of the deposit is commercial, it will be safety developed. We draw your attention to previous frontier areas such as the Gulf of Mexico, the North Sea, Cook Inlet and the Canadian Beaufort Sea. If we were presently considering a proposal to develop the reserves of Upper Cook Inlet, we would certainly be hearing scenarios of disaster due to earthguake, high fast tides and moving ice. And yet, major fields have been developed and produced in this extremely hostile environment. The production history of Upper Cook Inlet began over sixteen years ago and has demonstrated industry's capacity to conduct operations in a safe and responsible manner.

An implicit assumption in the supplement is that impacts will increase in intensity due to increased activity under the proposed schedule in proportion to the increased acreage offered. That assumption is incorrect. What the proposed schedule actually will do is allow earlier access to areas where industry believes there is a higher potential for petroleum discoveries.

Critics characterize the proposed schedule as "too much, too fast." Apparently it is their belief that if entire planning areas are offered for lease, the whole area will be leased and drilled up. The advantage of the planning area offer is that companies are free to pursue a diversity of exploration plans, not being restricted to limited tract offerings. As experience has shown, only a small percentage of any potential oil and gas basin proves to contain producible reserves. The end result of the approach of offering larger areas is a much greater chance of existing reserves being discovered efficiently.

The tiered EIS is an excellent proposal. There is no sense in attempting a comprehensive EIS for an entire planning area when less than 5-10 percent of it will ever be produced. When oil and gas are discovered, a subseguent detailed and site-specific EIS can be compiled, to which can be added firm knowledge of the resources.

Also, the fact remains that about 8 to 12 years are reguired for production of OCS oil and gas after a commercial discovery is made. This is surely ample time for communities on the coast of Alaska to develop their coastal zone management plans.

Oil spills are treated as a fact, because they are enumerated in the Draft Supplement by mathematical calculation, although it is mentioned elsewhere that these are potential possibilities--in other words, guesses. Historical operations on OCS leases have improved in recent years resulting in a downward trend towards fewer oil spills. The next analysis data includes spills that occurred in 1964 and, conseguently, does not reflect the downward trend. The spill freguency estimates in the DEIS are misleading and should be revised to reflect improved technology and practices which have greatly reduced oil spills.

The fishing and petroleum industry have co-existed in harmony for over 30 years in the Gulf of Mexico. It is well documented that offshore platforms are a haven for fish and are a favorite location for both commercial and recreational fishermen. Oil and gas activities on the Outer Continental Shelf have not caused any significant adverse impact on fishery resources in either the short or long term.

Opponents of OCS leasing suggest that sales be delayed for five or more years to provide for additional studies. However, to opponents of OCS oil and gas development, there is no such thing as an adeguate EIS. More knowledge will always be wanted. The point is to decide what reasonable and prudent amounts of knowledge are needed for exploration to proceed. Further, unless an area is on a lease schedule, federal funds for environmental studies will not be available.

Some critics acknowledge that OCS development may be needed, but maintain that it certainly not go forward off California, Massachussetts, New Jersey, parts of Alaska, etc. They depict the Department of the Interior and the industry as seeking to steamroller coastal communities into submission and ruin. But a fair guestion and one that is not sufficiently addressed is whether the energy needs of some 220 million Americans will be adeguately met.

The OCS lease sale program is critically important to our nation, and we thank you for the opportunity to present our

comments on many of the issues raised in the Draft Supplement to this Final Environmental Impact Statement for the proposed OCS lease sale schedule.

Very truly yours,

WILLIAM W. HOPKINS
Executive Director

WWH:km

Attachment

COMMENTS OF THE ALASKA ESKIMO
WHALING COMMISSION ON THE DRAFT SUPPLEMENTAL
ENVIRONMENTAL IMPACT STATEMENT ON THE PROPOSAL
BY THE DEPARTMENT OF THE INTERIOR FOR
THE FIVE YEAR OCS OIL AND GAS LEASE SCHEDULE

The Alaska Eskimo Whaling Commission (AEWC) submits the following comments on the draft supplemental environmental impact statement (DSEIS) concerning the Department of Interior's proposed five year OCS oil and gas lease sale schedule for the period January, 1982 through December, 1986. The AEWC is providing these comments in response to the request for comments which appeared in the Federal Register on June 10, 1981. 46 Fed. Reg. 30706.

The AEWC first associates itself with the comments submitted by the North Slope Borough. The purpose of these additional comments is to bring to the Department's attention the concern raised by the International Whaling Commission (IWC) at its most recent meeting with regard to the impact of an accelerated schedule of oil and gas development in areas inhabited by endangered species of whales.

I. INTRODUCTION

The Alaska Eskimo Whaling Commission is a non-profit corporation comprised of the Eskimo whaling captains from each of the Eskimo villages on the Arctic Slope of Alaska. These whalers take bowhead whales using the traditional methods of the Eskimo people. The AEWC also represents the thousands of Eskimos who participate in one form or another in the spring and fall hunts

which are a central part of the Eskimo culture and who rely on the bowhead whale for a substantial part of their nutritional needs.

As a result of commercial exploitation, the exact status of the Bering Sea stock of bowhead whales has been a subject of much debate. The bowhead whale has been listed as an endangered species under the Endangered Species Act, 16 U.S.C. §§ 1531, et seq., since 1970. The Eskimos have been continuing to take bowhead whales pursuant to exemptions for native taking for subsistence purposes contained in the Endangered Species Act as well as the Marine Mammal Protection Act, 16 U.S.C. §§ 1371, et seq. And, in 1977, the National Marine Fisheries Service made a finding under the Marine Mammal Protection Act that the bowhead whale should be classified as a depleted species.

The international community expressed its concern about the status of the bowhead population in July, 1977, when the International Whaling Commission (IWC) voted to prohibit the native taking of right whales.[1/] In December, 1977, and at every subsequent annual meeting, the IWC has agreed to permit a limited take of bowheads by Alaskan natives each year.

The AEWC was established in August of 1977, shortly after the Eskimos were first apprised of the international concern with regard to the status of the bowhead whale. Since that

1/ The bowhead is a species of right whale.

time, the AEWC has provided assistance and resources to help scientists determine the actual status of the stock and its net recruitment rate. The AEWC has also developed and implemented a management plan for each year's subsistence hunt designed to insure an efficient harvest of bowheads and to provide a means within Alaskan Eskimo customs and institutions of managing the bowhead hunt to prevent extinction of the stock. In addition, the AEWC has been conducting public education concerning the Eskimo's need for subsistence whaling and has been developing an extensive research program to learn more about the bowhead.

The AEWC is pleased with the progress that has been made by working with the current Administration to attempt to resolve the controversy surrounding the Eskimos taking of bowhead whales for subsistence purposes. We are very satisfied with the Cooperative Agreement reached with the National Oceanic and Atmospheric Administration concerning management of this year's spring and fall hunts. The AEWC also appreciated being represented on the United States delegation to the Internationl Whaling Commission at its thirty-third annual meeting which took place in July. However, the AEWC views with concern the Interior Department's proposal to accelerate the five year OCS oil and gas lease sale schedule and simultaneously reduce the amount of funds available for vital scientific research on the impacts of such development. The International Whaling Commission shares this concern, as will be discussed below.

II. DISCUSSION

The DSEIS on the acceleration proposal concedes the shortcomings of the Department's data base with respect to the impact of the proposal on the bowhead whale population and on the subsistence culture which is so dependent on that population. The DSEIS acknowledges that the acceleration proposal will increase the risk of adverse impacts of oil and gas development on the bowhead whale, but does not even attempt to assess the significance of such impacts.[2/] At the same time, the federal government is reducing the amount of money available to fund the research that might make such assessments possible.

On the other hand, the United States presented a firm position at the Internatonal Whaling Commission with respect to the U.S. government's commitment to whale protection. President Reagan affirmed this commitment in a message dated July 17, 1981[3/] which urged the contracting nations of the IWC to support the U.S. proposal for an indefinite moratorium on commercial whaling. The United States also recommended to the IWC revisions to commercial management procedures to, as President Reagan noted in his letter, "reflect the inadequate information on whale biology, behavior, population dynamics, and most importantly, abundance."

2/ The federal government has an obligation under the Endangered Species Act to protect endangered species; this obligation can not be obviated by professing ignorance as to what the consequences of a federal action may be.

3/ Attached hereto as Appendix A.

During meetings of the Scientific Committee, the Technical Committee and the Plenary Sessions of the IWC, concern was expressed that at the same time that the United States was strongly advocating an end to commercial whaling by other nations, it was pursuing a rapid schedule of leasing lands on the Outer Continental Shelf that presented risks to the critical habitat and migration areas of a protected stock of whales.[4/] Both the Scientific Committee and the IWC as a whole specifically recorded their concerns in the form of a recommendation by the Scientific Committee and a resolution unanimously agreed to at the Plenary Session.

Specifically, the Scientific Committee noted at page 5 of the "Report of the Subcommittee on Protected Species and Aboriginal Whaling:"

> In view of the risks to the bowhead whale inherent in the present proposed offshore oil and gas activities in the Bering, Chukcki and particularly the Beaufort Sea, the subcommittee recommends that research be continued to define precisely migration routes and critical habitats of the bowhead whale.

The Scientific Committee was encouraged by the work that is being done by the Scientific Advisory Committee to the AEWC. Our Advisory Committee has prepared a report which recommends research priorities with regard to the bowhead whale to assess

4/ The bowhead has been classified by the IWC as a "protected stock" and therefore is already subject to protection from commercial whaling operations.

both the status of the stock and the impact of offshore development on its feeding, reproductive and migrating habits.[5/] The Committee's list of recommended studies emphasizes how little basic biological information is known about this marine mammal which is the cultural and nutritional focal point of an entire culture.

In addition, the IWC Scientific Committee will be sending a representative to a three day conference being sponsored by the AEWC on "The Biology of the Bowhead Whale." The AEWC hopes that this conference will serve to review the status of current research on the bowhead and to improve the communications among the various parties conducting such research.[6/]

During the plenary session, the IWC adopted a resolution which notes "the possible effects to whale stocks which may be caused by shipping and offshore mining and drilling activities," and

> calls upon members of the Commission to encourage national scientific programs in such matters and to provide to the Scientific Committee relevant data resulting from national research or from relevant international organizations in the field of oceanography and marine pollution.

5/ The Report of the Scientific Advisory Committee is attached as Appendix B.

6/ A notice of the Conference is attached as Appendix C.

III. CONCLUSION

The concerns expressed at the IWC as to the impact of offshore development on the bowhead coincide with the concerns of the AEWC. The AEWC has sought funding for the research projects identified in the Report prepared by its Scientific Advisory Committee from the federal government, the State of Alaska and the private sector. Funds have been forthcoming to a limited degree, but much more support is needed particularly from the federal level.

Until the necessary studies are conducted so that the government can assess the impact of offshore development on the bowhead whale and thus incorporate protective stipulations in the leases,[7/] the AEWC strongly believes that the government has not met its statutory obligations under the Endangered Species Act and its international obligations under the Whaling Convention Act of 1949, 16 U.S.C. §§ 916, et seq. It is our position that the accelerated offshore leasing schedule as proposed should not be permitted to go into effect until the government is in a position to impose stipulations in OCS leases which will effectively protect the bowhead whale.

7/ This, of course, assumes that such stipulations will not be waived even if they prove to be inconvenient.

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Appendix 1

INDUSTRY INTEREST IN OCS LEASING REGIONS

Interest of Potential Oil and Gas Producers

On December 31, 1980, the Department of the Interior published a notice in the Federal Register requesting comments on the possible revision or reapproval of the 5-Year OCS oil and gas leasing program. This notice requested, inter alia, ranking of each planning area by oil and gas potential and by interest in exploration and development. The planning areas are shown in the maps in Figures 1 and 2.

Fifteen letters were received from industry in response to this Federal Register notice. Five companies responded specifically to this request. The aggregate of this ranking is shown on table 1. Only two companies ranked areas by interest in exploration and development. We believe this response level is too small to provide a valid ranking.

Three companies provided a numerical ranking of all 19 planning areas, one through nineteen. One company ranked areas "very high," "high," "moderate" and "low." The fifth company ranked areas "high," medium" and "low." These rankings were converted to a common ranking system to develop the consolidated ranking list.

Since the December 31, 1980, notice was published, the boundaries of some of the OCS planning areas have been changed. These changes, which are shown in Figures 3 and 4, make it impossible to apply the industry ranking consistently to areas included in the proposed 5-Year Program.

Other comments received in response to the December 31, 1980 Federal Register notice which provide an indication of industry interest are summarized in table 2. Twenty-seven letters from industry were received on the draft proposed program, which was published in the Federal Register on April 17, 1981. Four of these responses provided an indication of industry interest in specific areas. These responses are also summarized in table 2. None of the industry comments on the July 24, 1981, proposed program provided new information on areas of interest.

Table 1

Industry Ranking of Resource Potential

January-February 1981

1. Beaufort Sea
2. Gulf of Mexico
3. Chukchi Sea
4. Navarin Basin
5. Southern California
6. St. George Basin
7. Central and Northern California
8. North Atlantic
9. Norton Basin
10. Bristol Bay
11. North Aleutian Shelf
12. Mid-Atlantic
13. South Atlantic
14. Gulf of Alaska
15. Hope Basin
16. Cook Inlet
17. Washington-Oregon
18. Kodiak
19. South Aleutian Shelf

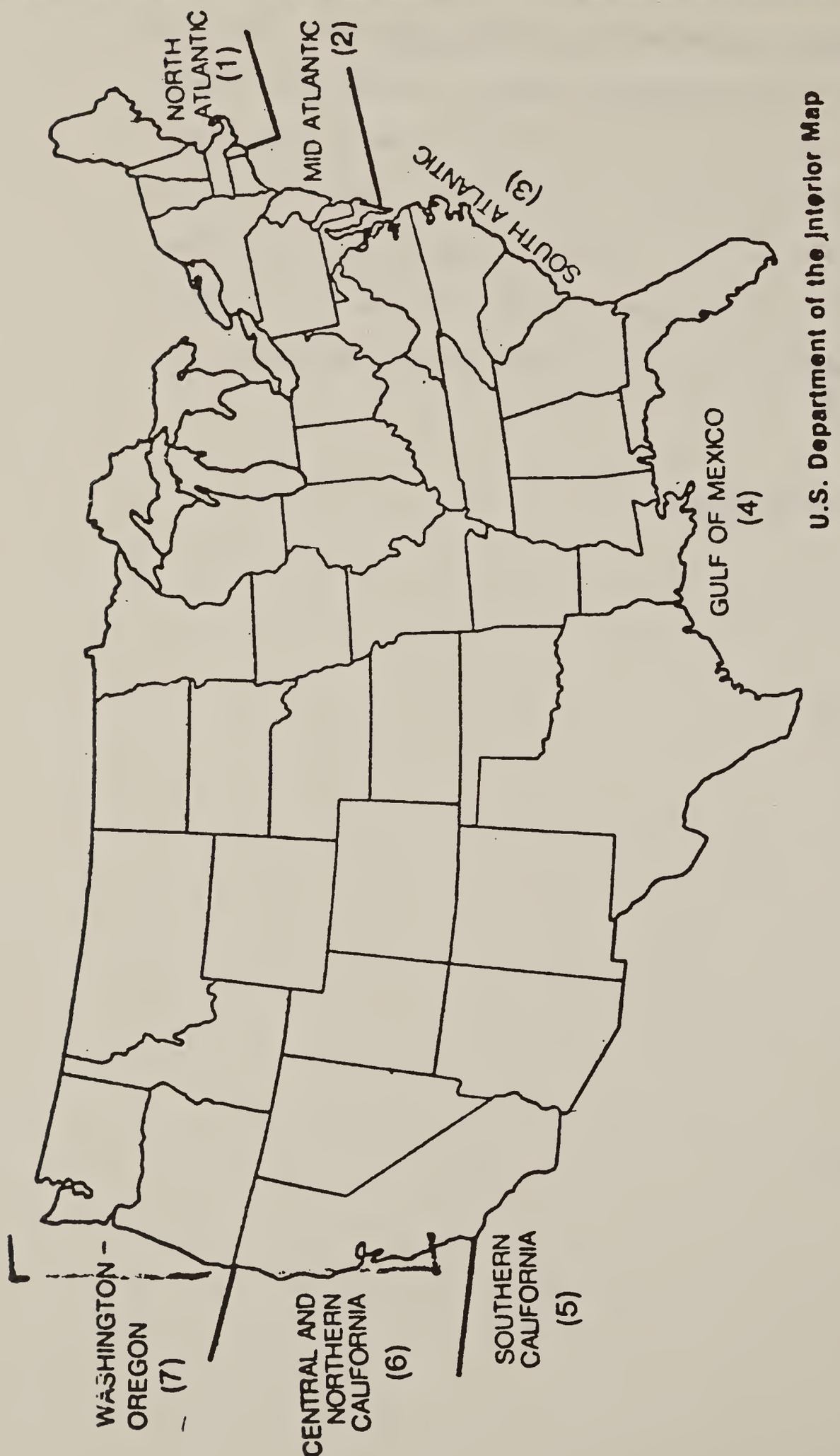
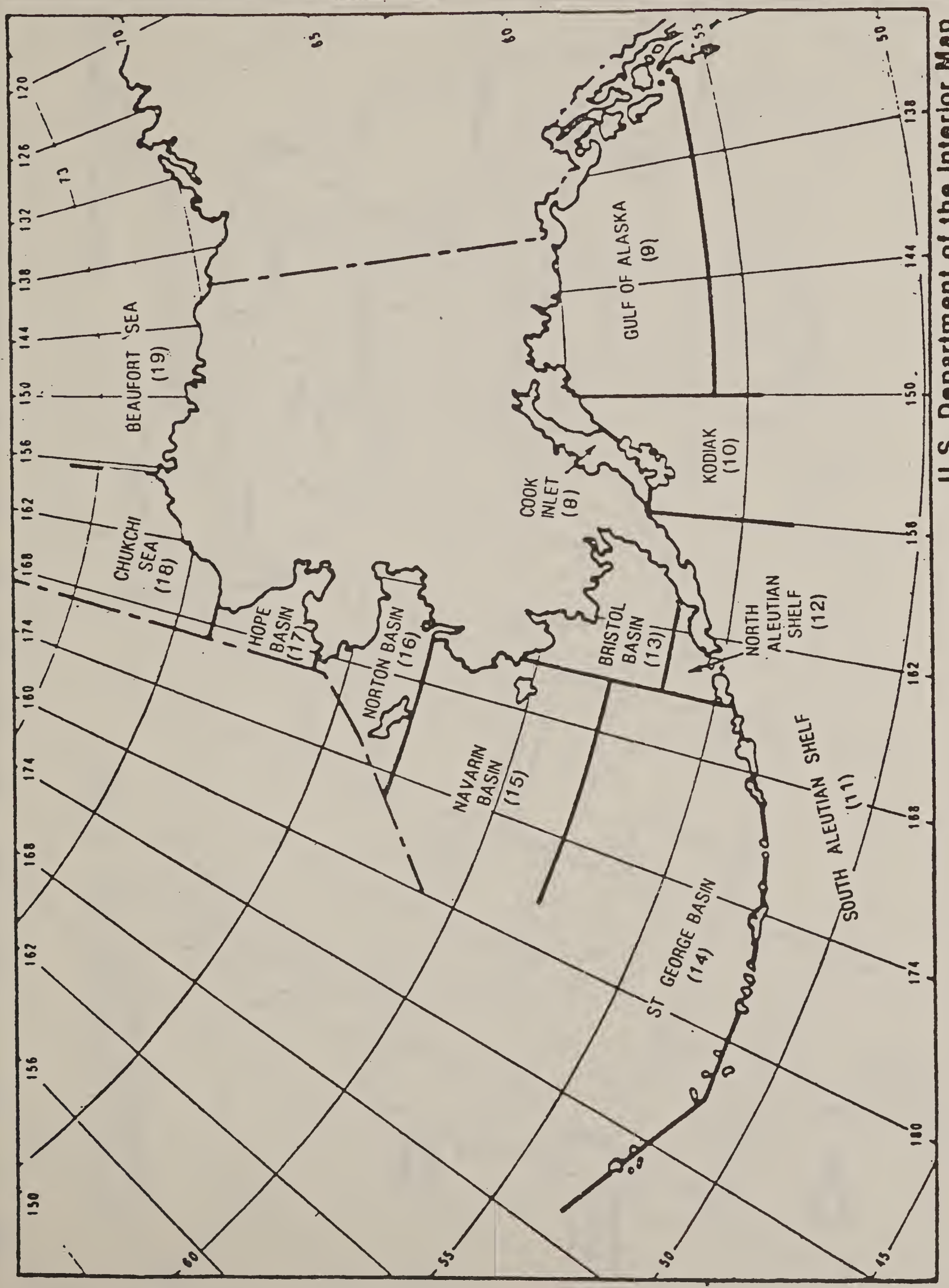
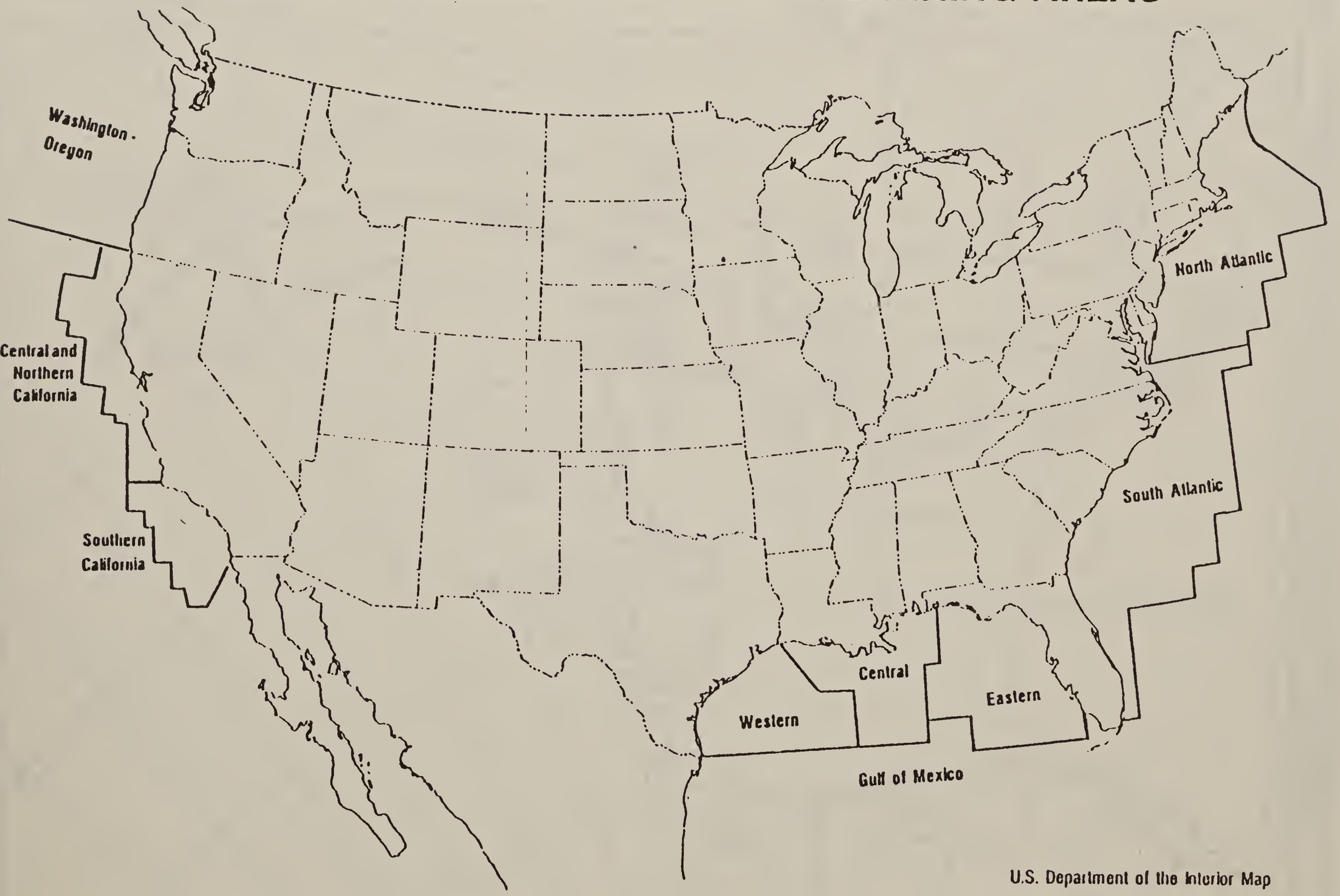

NORTH ATLANTIC (1)
MID ATLANTIC (2)
SOUTH ATLANTIC (3)
GULF OF MEXICO (4)
SOUTHERN CALIFORNIA (5)
CENTRAL AND NORTHERN CALIFORNIA (6)
WASHINGTON - OREGON (7)
U.S. Department of the Interior Map

Figure 2



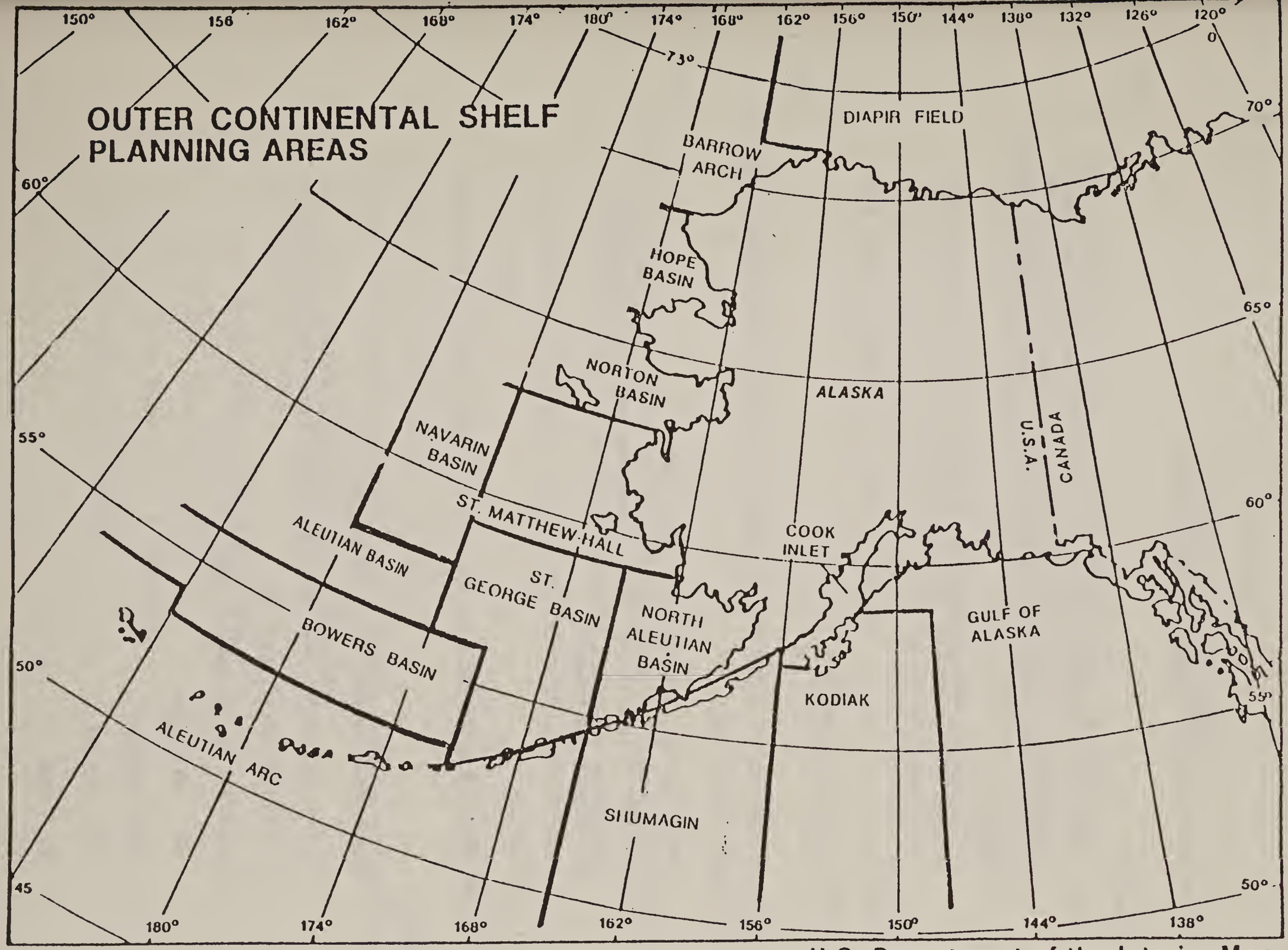
BILLING CODE 4310-10-C

OUTER CONTINENTAL SHELF PLANNING AREAS



U.S. Department of the Interior Map

Figure 3



U.S. Department of the Interior Map

Figure 4

Table 2

1. Responses to 12/31/80 Federal Register Notice

Chevron:

Add - Norton Sea - portion covered in EIS but not included in sale 57

- Beaufort Sea - offshore NPRA and offshore Arctic National Wildlife Range
- Bristol Bay - schedule for August 1984

Pennzoil:

Follow existing schedule

Gulf:

For 1985 & 1986, add:

- Beaufort Sea - east of 1979 leased area
- Northern & Central California - particularly Eel River Basin
- Washington and Oregon

Cities Service:

Follow existing schedule

Amoco:

- Favor more frequent sales in frontier areas
- Hold a sale in the near term in Bristol Bay - combine it with N. Aleutian Shelf, sale 75
- Accelerate, preferably to 1983
  - 80 - California
  - 83 - Navarin
  - 85 - Chukchi
  - 86 - Hope

- Ranking of other areas: 1. Gulf of Mexico
  2. Mid-Atlantic
  3. North and South Atlantic

Mobil:

- Change emphasis from excessive reliance on Gulf of Mexico to frontier areas, particularly Alaska: "The nation could derive a much greater return on it's [sic] increasingly scarce petroleum technicians and their equipment if emphasis were shifted to the Alaskan frontier where potential exists for discovery of much larger hydrocarbon accumulations."

ARCO:

Provided ranking table, which is included in the table 1 aggregate ranking.

Exxon:

Provided ranking table, which is included in the table 1 aggregate ranking.

- Of frontier areas, St. George and Navarin should be leased and explored first; timing for Chukchi sale (in 6/80 program) seems about right.
- Recommend early evaluation of Central and Northern California, North Aleutian Shelf/Bristol Basin, and Norton.
- Basins in low potential category should receive little or no emphasis as would divert industry from more promising areas.
- Sale recommendations:
  1. St. George early in 1982 and in 1985
  2. Add Beaufort Sea sale in 1984
  3. N. Aleutian Shelf sale in late 1982
  4. Navarin sale in early 1983

5. Postpone Kodiak and Hope beyond the schedule

Shell:

- Provided ranking table, which is included in the table 1 aggregate ranking.
- Sales 60 and 61 Cook Inlet and Kodiak should be cancelled
- Current schedule for other areas is O.K. Proposed Alaska schedule:

Norton	1982, 1983
St. George	1982, 1983, 1984, 1985
Beaufort	1982, 1983, 1984, 1985
N. Aleutian Shelf	1983, 1984, 1985
Chukchi	1984, 1985
Hope	1985

Diamond Shamrock:

Provided ranking table, which is included in the table 1 aggregate ranking.

Champlin:

Provided comments on existing information on each area and ranking table, which is included in the table 1 aggregate ranking.

Union Oil:

- Changes needed only for Alaska sales, to integrate anticipated NPRA sales, State of Alaska sales, and California OCS sales into an overall schedule:

  Bristol Bay - 1984

  Norton - delay to 3rd quarter of 1983

  Chukchi - delay to 4th quarter of 1985

  Hope - delay to 2nd quarter of 1986

Pogo:

Accelerate Alaska sales

2. Responses to April 1981 draft proposed program

ARCO: Immediate attention not warranted on

St. Matthew-Hall

Hope Basin

Bowers Basin

Shumagin

Aleutian Arch

Kodiak

Aleutian Basin

Chevron: Kodiak has greater potential than St. Matthew-Hall

Exxon: Drop St. Matthew-Hall, add 2nd sale in Navarin

Shell: Kodiak, Shumagin, Aleutian Arch, Aleutian Basin and Bowers Basin should be offered last

Appendix 2

Estimates of Undiscovered Recoverable Resources of Conventionally Producible Oil and Gas In the United States, A Summary

U.S. Geological Survey, 1981

UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

ESTIMATES OF UNDISCOVERED RECOVERABLE RESOURCES OF CONVENTIONALLY PRODUCIBLE OIL AND GAS IN THE UNITED STATES, A SUMMARY

by

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OPEN-FILE REPORT 81-192

This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards.

1981

INTRODUCTION

In 1975 the U.S. Geological Survey (USGS) published estimates of the undiscovered recoverable oil and gas resources of the United States (Miller and others, 1975). These estimates were a product of the geologic knowledge of U.S. petroleum provinces and of methods of resource appraisal at that time. A new appraisal was made in 1980 to incorporate new geologic information, new technology, economic changes, and new or refined methods of resource appraisal. This brief open-file report represents the final resource estimates but does not include detailed discussions of geology and methodology.

COMMODITIES ASSESSED

In the present study we appraised undiscovered recoverable resources of conventionally producible crude oil and natural gas. Undiscovered recoverable resources are those resources which can be extracted economically under existing technology and price/cost relationships assuming normal short-term technologic growth. However, in offshore Alaska, these quantities include some resources which are recoverable only if technology permits their exploitation beneath Arctic pack ice - a condition not yet met. The assessed resources occupy the shaded area on the resource classification chart (figure 1) as defined in 1980 by the USGS and U.S. Bureau of Mines. Undiscovered recoverable resources do not include quantities which may yet be found in new pays or extensions of existing fields. Crude oil is a natural mixture of hydrocarbons occurring underground in a liquid state in reservoir rock and remaining in a liquid state as it is produced from wells. Natural gas is a mixture of gaseous hydrocarbons occurring underground in reservoir rock, in association with crude oil as free gas, dissolved in crude oil, or in a free state not associated with crude oil. We have excluded from this assessment resources from heavy oil deposits, tar deposits, oil shales, gas in impermeable "tight" reservoirs, gas occluded in coal, gas in geopressured shales and brines, and natural gas hydrates.

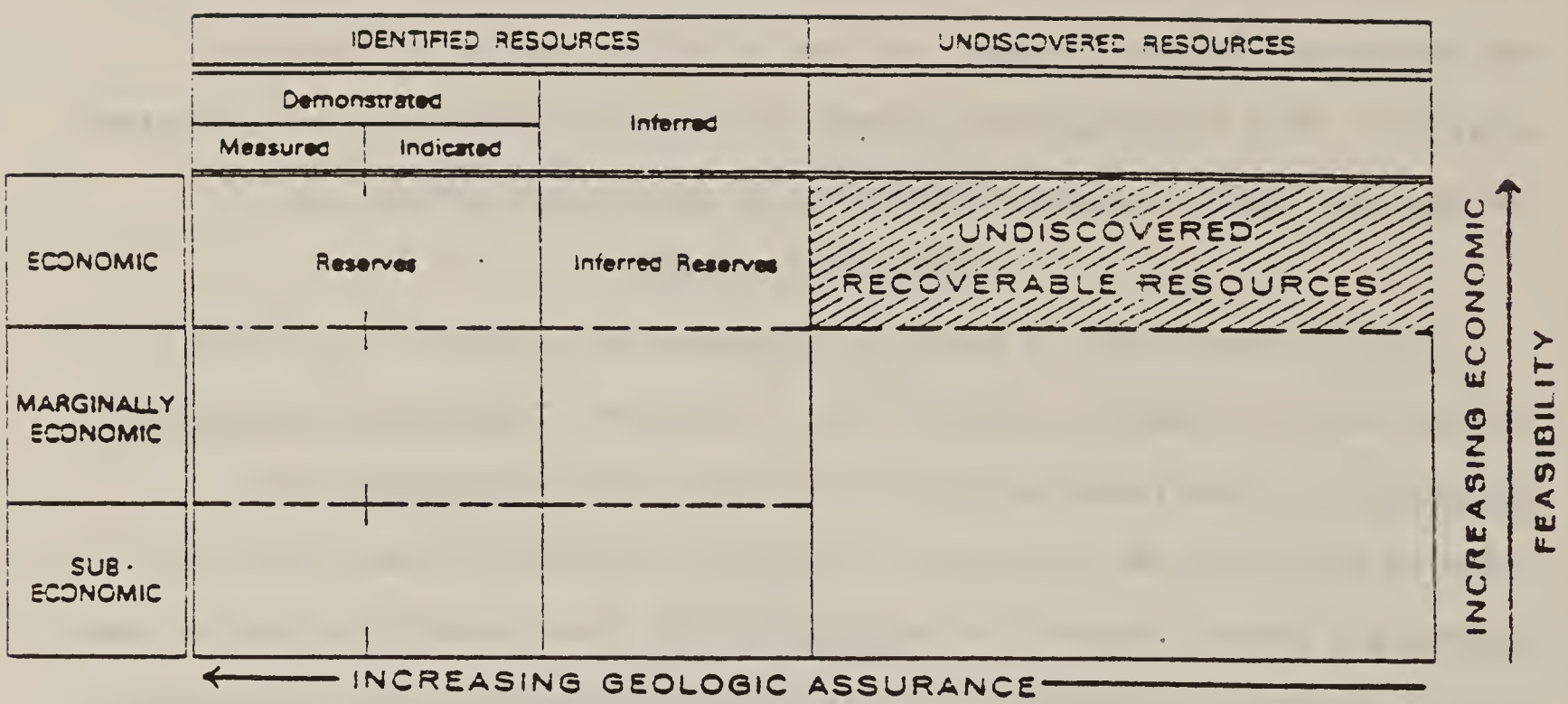

Figure 1.—Petroleum resource classification (modified from U.S. Bureau of Mines and U.S. Geological Survey, 1980). The shaded area indicates the undiscovered recoverable resources discussed in this report.

AREAS OF STUDY

For this study, the United States was divided into 15 petroleum regions, 11 onshore and 4 offshore (figure 2). These regions correspond in general to those appraised in 1975; however, the Continental Slopes are included in the present report, thereby increasing the offshore area assessed. The 15 regions were further subdivided into 137 provinces which were the actual assessment units. Hawaii was not included because its volcanic terrane is not considered prospective for hydrocarbons.

METHODS OF ASSESSMENT

The assessments of the undiscovered recoverable oil and gas in each province were based fundamentally upon careful analysis and review of the province petroleum geology, exploration history, volumetric-yield procedures, finding-rate studies, and structural analyses. Because of the uncertainty involved in estimating undiscovered resources, estimates of their quantities include a range of values corresponding to different probability levels. Subjective probability procedures were used in their derivation.

Initial assessments, conditional upon recoverable resource being present, were made for each of the assessed provinces as follows:

1) a low resource estimate corresponding to a 95 percent probability of more than that amount; this estimate is the 95th fractile (F_{95});
2) a high resource estimate corresponding to a 5 percent probability of more than that amount; this estimate is the 5th fractile (F_5);
3) a modal ("most likely") estimate of the quantity of resource associated with the greatest likelihood of occurrence.

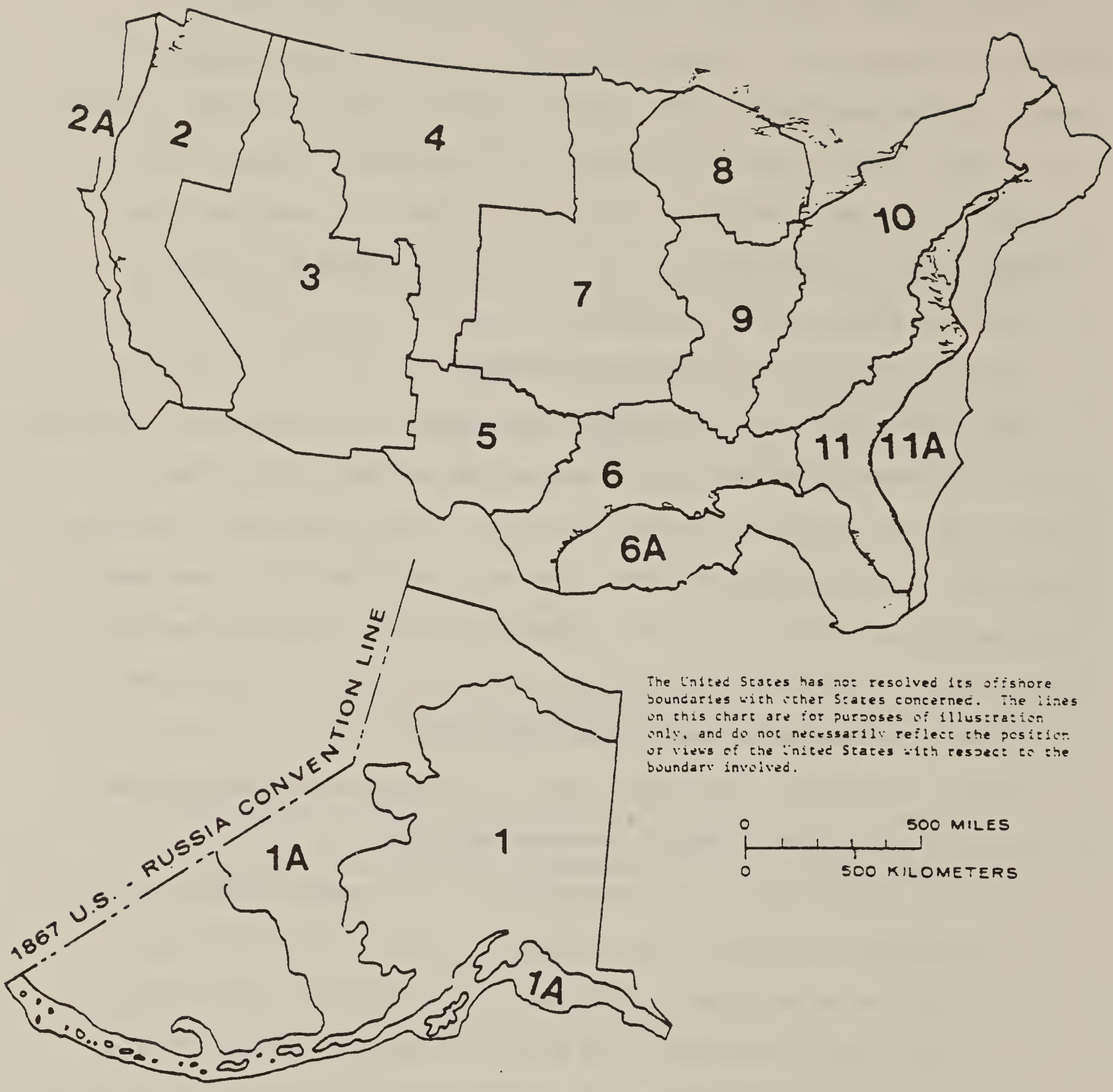

FIGURE 2.--Index maps showing the regional boundaries used:

Region 1, Alaska;
Region 1A, Alaska Offshore;
Region 2, Pacific Coast;
Region 2A, Pacific Coast Offshore;
Region 3, Colorado Plateau and Basin and Range;
Region 4, Rocky Mountains and Northern Great Plains;
Region 5, West Texas and Eastern New Mexico;
Region 6, Gulf Coast;
Region 6A, Gulf of Mexico;
Region 7, Mid-continent;
Region 8, Michigan Basin;
Region 9, Eastern Interior;
Region 10, Appalachians;
Region 11, Atlantic Coast;
Region 11A, Atlantic Coast Offshore.

These initial estimates determined for each province a conditional probability distribution of the quantity of undiscovered recoverable resource. However, in frontier areas where there has been little or no drilling, there is a risk that no recoverable petroleum exists. Therefore, the likelihood of any recoverable resource being present was estimated and called the marginal probability.

The marginal probability for each province was applied to its corresponding conditional probability distribution to produce the probability distribution of the quantity of undiscovered recoverable resource. From this distribution the final low (F_{95}), high (F_5), and mean estimates were obtained for each province.

To arrive at total resource estimates for a region, the probability distributions of the provinces composing the region were aggregated by a Monte Carlo technique. The resulting aggregate probability distribution represents the probability distribution of the <u>total</u> quantity of undiscovered recoverable resource for the region. From this distribution the low (F_{95}), high (F_5), and mean estimates were obtained for each of the 15 regions (table 1).

RESULTS

The assessed conventionally producible undiscovered recoverable oil and gas resources for the United States are estimated to range from 64.3 billion barrels of oil and 474.6 trillion cubic feet of gas to 105.1 billion barrels of oil and 739.3 trillion cubic feet of gas, corresponding to 95 percent and 5 percent probabilities of more than these amounts, respectively.

The results presented in table 1 show that the mean total amount of oil appraised for the entire United States and its offshore areas has changed very little from our 1975 appraisal, whereas the estimated total for natural gas has increased. One should recognize, however, that resources of the Continental Slope are included in the current assessment, but were not included in the 1975 report.

Petroleum Regions	Crude Oil (billion barrels)			Total Natural Gas (trillion cubic feet)		
	Low F_{95} 1/	High F_5	Mean 2/	Low F_{95} 1/	High F_5	Mean 2/
Onshore Regions						
1 - Alaska	2.5	14.6	6.9	19.8	62.3	36.6
2 - Pacific Coast	2.1	7.9	4.4	8.2	24.9	14.7
3 - Colorado Plateau & Basin and Range	6.9	25.9	14.2	53.5	142.4	90.1
4 - Rocky Mountains and northern Great Plains	6.0	14.0	9.4	29.6	69.0	45.8
5 - West Texas and eastern New Mexico	2.7	9.4	5.4	22.4	75.2	42.8
6 - Gulf Coast	3.6	12.6	7.1	56.5	249.1	124.4
7 - Mid-continent	2.3	7.7	4.4	22.9	80.8	44.5
8 - Michigan Basin	0.3	2.7	1.1	1.8	10.9	5.1
9 - Eastern Interior	0.3	1.9	0.9	1.2	5.0	2.7
10 - Appalachians	0.1	1.6	0.6	6.4	45.8	20.1
11 - Atlantic Coast	0.1	0.8	0.3	<0.	0.4	0.1
TOTAL ONSHORE	41.7	71.0	54.6	322.5	567.9	426.9
Offshore Regions (Shelf and Slope)						
1A - Alaska 3/	4.6	24.2	12.3	33.3	109.6	64.6
2A - Pacific Coast	1.7	7.9	3.8	3.7	13.6	6.9
6A - Gulf of Mexico	3.1	11.1	6.5	41.7	114.2	71.9
11A - Atlantic Coast	1.1	12.9	5.4	9.2	42.8	23.6
TOTAL OFFSHORE	16.9	43.5	28.0	117.4	230.6	167.0
TOTAL UNITED STATES	64.3	105.1	82.6	474.6	739.3	593.9
LOWER 48 ONSHORE	36.1	62.0	47.7	288.6	525.9	390.3
LOWER 48 OFFSHORE	8.7	25.1	15.8	66.1	148.2	102.4

1/ F_{95} denotes the 95th fractile; the probability of more than the amount F_{95} is 95%. F_5 is defined similarly.

2/ Mean values may not be precisely additive owing to rounding.

3/ Includes quantities considered recoverable only if technology permits their exploitation beneath Arctic pack ice - a condition not yet met.

Table 1.-- Estimates of undiscovered recoverable oil and gas resources by petroleum region.

Some significant differences exist between these new regional estimates and those published in 1975 by Miller and others. These differences essentially reflect the results of new data, providing a better understanding and evaluation of petroleum potential. Results of exploratory drilling in some frontier areas, particularly the Gulf of Alaska, southern California borderland, south Atlantic shelf, and eastern Gulf of Mexico have been disappointing and geologic information obtained from those provinces indicates reduced hydrocarbon potential. Drilling in the Cordilleran overthrust belt of the Western United States (Regions 3 and 4), on the other hand, has uncovered a large potential for both oil and gas, which is reflected in the estimates.

The individual province estimates that make up the regional totals given in table 1 are shown in tables 2 and 3, and province locations are indicated in figures 3 and 4.

TABLE 2. - ESTIMATES OF UNDISCOVERED RECOVERABLE OIL AND GAS IN OFFSHORE PROVINCES OF THE UNITED STATES

	Crude Oil (Billion Barrels)			Associated/Dissolved Gas (Trillion Cubic Feet)			Non-Associated Gas (Trillion Cubic Feet)		
	Low F_{95} 1/	High F_5 1/	Mean	Low F_{95} 1/	High F_5 1/	Mean	Low F_{95} 1/	High F_5 1/	Mean
SHELF (0-200 meters water)									
Region 1A. Alaska									
1. Beaufort *	1.9	16.7	7.0	3.0	26.8	11.1	6.4	58.5	23.9
3. North Chukchi *	0	4.2	.8	0	6.3	1.2	0	11.4	2.2
5. Central Chukchi *	0	3.3	.6	0	4.9	.9	0	10.4	2.1
6. Hope *	0	.1	Negl.	0	.2	Negl.	0	1.6	.3
8. Norton	0	.9	.2	0	1.4	.2	0	4.1	1.0
9. Bristol	0	1.2	.2	0	1.9	.3	0	3.7	.7
10. Navarin Basin	0	3.7	.8	0	5.5	1.2	0	16.6	4.0
12. St. George Basin	0	2.2	.4	0	3.3	.6	0	7.4	1.7
13. Zhemchug	0	.2	Negl.	0	.3	Negl.	0	.7	.1
15. St. Matthew-Hall	0	0	0	0	0	0	0	0	0
16. Aleutian	0	0	0	0	0	0	0	0	0
18. Kodiak	0	1.0	.2	0	1.7	.3	0	5.2	1.0
20. Shumagin	0	.2	Negl.	0	.3	.1	0	1.6	.2
22. Gulf of Alaska	0	1.5	.3	0	2.2	.4	0	5.9	1.3
24. Cook Inlet	.1	1.0	.4	Negl.	.6	.2	.7	4.6	2.0
25. Shelikof Strait Shallow	0	.2	Negl.	0	.1	Negl.	0	.7	.1
Region 2A. Pacific Coast									
27. Inner Basins	.1	.9	.4	.1	.8	.3	0	0	0
29. Outer Basins and Ridges Shallow	0	.1	Negl.	0	.1	Negl.	0	0	0
31. Santa Barbara Channel	.1	1.6	.6	.1	1.4	.5	.1	1.7	.5
33. Santa Maria	0	.8	.2	0	.7	.2	0	0	0
35. Santa Cruz	0	.6	.1	0	.4	.1	0	0	0
37. Bodega	0	.2	Negl.	0	.2	Negl.	0	0	0

1/ F_{95} denotes the 95th fractile; the probability of more than the amount F_{95} is 95%. F_5 is defined similarly.

* These quantities can be considered recoverable only if technology permits their exploitation beneath Arctic pack ice - a condition not yet met.

TABLE 2. - ESTIMATES OF UNDISCOVERED RECOVERABLE OIL AND GAS IN OFFSHORE PROVINCES OF THE UNITED STATES--Continued

	Crude Oil (Billion Barrels)			Associated/Dissolved Gas (Trillion Cubic Feet)			Non-Associated Gas (Trillion Cubic Feet)		
	Low F_{95} 1/	High F_5 1/	Mean	Low F_{95} 1/	High F_5 1/	Mean	Low F_{95} 1/	High F_5 1/	Mean
SHELF (0-200 meters water)									
Region 2A. Pacific Coast (con't)									
39. Point Arena	0	.2	Negl.	0	.2	Negl.	0	0	0
41. Eel River	0	.2	Negl.	0	.2	Negl.	0	.9	.2
43. Oregon-Washington	0	.6	.1	0	.7	.1	0	2.1	.5
Region 6A. Gulf of Mexico									
45. Eastern Gulf	0	3.8	1.2	0	3.1	.9	0	5.9	1.5
47. Western Gulf	1.1	5.7	2.8	1.8	9.6	4.8	16.1	72.6	38.1
Region 11A. Atlartic Coast									
49. North Atlantic	0	2.1	.4	0	2.5	.6	0	7.2	1.6
51. Mid-Atlantic	0	2.6	.8	0	3.2	.9	0	11.6	4.7
53. South Atlantic	0	.3	Negl.	0	.3	Negl.	0	.7	.1
56. Southeast Florida	0	0	0	0	0	0	0	0	0
SLOPE (>200 meters water)									
Region 1A. Alaska									
2. Beaufort *	0	3.6	.8	0	5.7	1.2	0	12.6	3.1
4. North Chukchi *	0	1.1	.2	0	1.7	.4	0	3.2	.8
7. Umnak Plateau *	0	0	0	0	0	0	0	0	0
11. Navarin Basin	0	.6	.1	0	1.0	.1	0	1.8	.3
14. Zhemchug	0	0	0	0	0	0	0	0	0
17. Aleutian	0	0	0	0	0	0	0	0	0
19. Kodiak	0	1.0	.2	0	1.8	.3	0	2.1	.5

1/ F_{95} denotes the 95th fractile; the probability of more than the amount F_{95} is 95%. F_5 is defined similarly.

* These quantities can be considered recoverable only if technology permits their exploitation beneath Artic pack ice - a condition not yet met.

TABLE 2. - ESTIMATES OF UNDISCOVERED RECOVERABLE OIL AND GAS IN OFFSHORE PROVINCES OF THE UNITED STATES--Continued

	Crude Oil (Billion Barrels)			Associated/Dissolved Gas (Trillion Cubic Feet)			Non-Associated Gas (Trillion Cubic Feet)		
	Low F_{95} 1/	High F_5 1/	Mean	Low F_{95} 1/	High F_5 1/	Mean	Low F_{95} 1/	High F_5 1/	Mean
SLOPE (>200 meters water)									
Region 1A. Alaska (con't)									
21. Shumagin	0	.2	Negl.	0	.3	.1	0	1.6	.3
23. Gulf of Alaska	0	.6	.1	0	1.0	.2	0	1.7	.3
26. Shelikof Strait Deep	0	0	0	0	0	0	0	0	0
Region 2A. Pacific Coast									
28. Inner Basins Deep	0	1.0	.2	0	.9	.2	0	0	0
30. Outer Basins and Ridges Deep	0	2.5	.5	0	3.7	.8	0	.7	.1
32. Santa Barbara Channel Deep	.1	2.1	.7	.1	2.5	.8	0	1.9	.7
34. Santa Maria	0	2.2	.5	0	2.0	.4	0	0	0
36. Santa Cruz	0	.5	.1	0	.4	.1	0	0	0
38. Bodega	0	.2	Negl.	0	.1	Negl.	0	0	0
40. Point Arena	0	.4	.1	0	.3	Negl.	0	0	0
42. Eel River	0	.2	Negl.	0	.3	Negl.	0	1.2	.3
44. Oregon-Washington	0	1.3	.2	0	1.6	.3	0	3.0	.6
Region 6A. Gulf of Mexico									
46. Eastern Gulf	0	1.0	.2	0	.8	.2	0	1.8	.4
48. Western Gulf	.9	4.8	2.4	1.6	8.7	4.2	7.2	47.6	21.4
Region 11A. Atlantic Coast									
50. North Atlantic	0	3.8	1.0	0	4.6	1.1	0	7.9	2.1
52. Mid-Atlantic	0	7.6	2.3	0	9.1	2.7	0	17.8	5.9
54. Carolina Trough	0	3.0	.6	0	3.3	.7	0	9.6	2.3
55. Blake Plateau	0	1.7	.3	0	1.7	.3	0	2.4	.4
57. Florida Straits	0	0	0	0	0	0	0	0	0

1/ F_{95} denotes the 95th fractile; the probability of more than the amount F_{95} is 95%. F_5 is defined similarly.

TABLE 3. - ESTIMATES OF UNDISCOVERED RECOVERABLE OIL AND GAS IN ONSHORE PROVINCES OF THE UNITED STATES

	Crude Oil (Billion Barrels)			Associated/Dissolved Gas (Trillion Cubic Feet)			Non-Associated Gas (Trillion Cubic Feet)		
	Low F_{95} 1/	High F_5 1/	Mean	Low F_{95} 1/	High F_5 1/	Mean	Low F_{95} 1/	High F_5 1/	Mean
Region 1. Alaska									
58. Arctic Coastal Plain	.9	11.6	4.4	2.4	30.1	11.4	1.4	17.6	6.7
59. Northern Foothills	.3	3.9	1.4	.6	9.3	3.4	2.6	18.5	8.3
60. Southern Foothills and Brooks Range	0	.9	.2	0	2.4	.4	0	6.9	1.6
61. Yukon-Porcupine Basins	0	0	0	0	0	0	0	0	0
62. Yukon-Koyukuk Basins	0	0	0	0	0	0	0	.6	.1
63. Interior Lowlands	0	0	0	0	0	0	0	0	0
64. Bristol Basin Onshore	0	.6	.1	0	.6	.1	0	1.7	.4
65. Hope Basin Onshore	0	0	0	0	0	0	0	0	0
66. Copper River Basin	0	.1	Negl.	0	.1	Negl.	0	.5	.1
67. Cook Inlet Onshore	.1	1.5	.6	Negl.	.6	.2	1.1	7.2	3.3
68. Alaska Peninsula	0	.2	Negl.	0	.2	Negl.	0	.7	.1
69. Gulf of Alaska Onshore	0	.8	.2	0	.9	.2	0	.8	.1
70. Kodiak Island	0	0	0	0	0	0	0	0	0
71. Southeastern Alaska	0	0	0	0	0	0	0	0	0
Region 2. Pacific Coast									
72. Western Oregon-Washington	0	.5	.1	0	.4	.1	.5	4.8	1.9
73. Sacramento Basin	0	Negl.	0	Negl.	.1	Negl.	.5	3.2	1.5
74. San Joaquin Basin	.5	4.4	1.8	.5	4.4	1.8	.1	.8	.3
75. Los Angeles Basin	.2	1.5	.7	.2	1.4	.6	0	.1	Negl.
76. Ventura Basin	.2	1.2	.5	.3	2.1	1.0	Negl.	.3	.1
77. Santa Maria Basin	Negl.	.5	.2	Negl.	.4	.2	0	0	0
78. Central Coastal Basins	Negl.	.4	.2	Negl.	.2	.1	0	Negl.	Negl.
79. Sonoma-Livermore Basins	0	Negl.	Negl.	0	Negl.	Negl.	0	Negl.	Negl.
80. Humboldt Basin	0	0	0	0	0	0	Negl.	.2	.1
81. Eastern Oregon-Washington	0	3.0	.8	0	4.5	1.2	1.4	14.4	5.8
81A. Eastern California	0	0	0	0	0	0	0	0	0

1/ F_{95} denotes the 95th fractile; the probability of more than the amount F_{95} is 95%. F_5 is defined similarly.

TABLE 1. - ESTIMATES OF UNDISCOVERED RECOVERABLE OIL AND GAS IN ONSHORE PROVINCES OF THE UNITED STATES--Continued

	Crude Oil (Billion Barrels)			Associated/Dissolved Gas (Trillion Cubic Feet)			Non-Associated Gas (Trillion Cubic Feet)		
	Low F_{95} 1/	High F_5 1/	Mean	Low F_{95} 1/	High F_5 1/	Mean	Low F_{95} 1/	High F_5 1/	Mean
Region 3. Colorado Plateau & Basin and Range									
82. Eastern Basin and Range	.2	11.9	3.3	.3	17.9	5.0	0	21.4	5.6
83. Western Basin and Range	0	1.9	.4	0	2.8	.6	0	2.6	.6
84. Idaho-Snake River Downwarp	0	0	0	0	0	0	0	0	0
85. Paradox Basin	.2	3.2	1.2	.4	5.5	2.0	.3	5.1	1.8
86. Uinta-Piceance-Eagle Basins	.4	3.8	1.6	.8	6.5	2.7	1.4	15.9	6.2
87. Park Basins	Negl.	.2	.1	Negl.	.6	.2	0	Negl.	Negl.
88. San Juan Basin	Negl.	.4	.1	.1	.8	.3	.8	7.1	3.0
89. Albuquerque-Santa Fe-San Luis Rift Basins	0	.2	Negl.	0	.3	.1	0	1.2	.3
90. Wyoming-Utah-Idaho Overthrust Belt	2.7	13.3	6.7	6.7	33.3	16.8	15.6	85.2	41.6
91. Northern Arizona	Negl.	1.0	.3	Negl.	1.2	.3	0	1.0	.2
92. South-central New Mexico	0	.2	Negl.	0	.4	.1	0	1.1	.3
93. Southern Arizona-Southwestern New Mexico	0	1.3	.3	0	1.5	.3	0	8.2	2.1
Region 4. Rocky Mountains and Northern Great Plains									
94. Williston Basin	.4	3.?	1.4	.8	5.8	2.6	.2	1.7	.8
95. Sioux Arch	0	0	0	0	0	0	0	0	0
96. Sweetgrass Arch	.1	1.?	.4	Negl.	.4	.2	.6	6.5	2.6
97. Central Montana	Negl.	.4	.2	Negl.	.2	.1	.1	1.6	.5
98. Montana Overthrust Belt	0	2.0	.6	0	4.4	1.3	1.8	20.6	8.0
99. Southwestern Montana	0	.6	.2	0	.9	.2	0	.7	.2
100. Wind River Basin	.2	1.4	.6	.1	.7	.3	.7	4.2	2.0
101. Powder River Basin	.5	2.8	1.4	.8	4.2	2.1	.1	1.2	.4
102. Southwestern Wyoming Basins	.8	6.0	2.6	.9	6.5	2.9	5.3	33.7	15.7
103. Big Horn Basin	.3	2.1	1.0	.2	1.6	.7	.6	3.7	1.7
104. Denver Basin	.2	1.8	.8	.2	1.8	.8	.5	3.1	1.4
105. Las Animas Arch	Negl.	.3	.1	0	Negl.	Negl.	.3	2.3	1.0
106. Raton Basin-Sierra Grande Uplift	0	.6	.2	0	.6	.2	Negl.	1.1	.4

1/ F_{95} denotes the 95th fractile; the probability of more than the amount F_{95} is 95%. F_5 is defined similarly.

TABLE 3. - ESTIMATES OF UNDISCOVERED RECOVERABLE OIL AND GAS IN ONSHORE PROVINCES OF THE UNITED STATES--Continued

	Crude Oil (Billion Barrels)			Associated/Dissolved Gas (Trillion Cubic Feet)			Non-Associated Gas (Trillion Cubic Feet)		
	Low F_{95} 1/	High F_5 1/	Mean	Low F_{95} 1/	High F_5 1/	Mean	Low F_{95} 1/	High F_5 1/	Mean
Region 5. West Texas and Eastern New Mexico									
107. Permian Basin	1.0	6.2	2.9	2.1	12.9	6.0	9.0	59.7	27.3
108. Palo Duro Basin	Negl.	.1	Negl.	0	Negl.	Negl.	Negl.	.4	.1
109. Pedernal Uplift	0	0	0	0	0	0	0	0	0
110. Bend Arch-Fort Worth Basin	.7	4.2	2.0	1.3	7.5	3.6	1.9	9.0	4.6
111. Marathon Fold Belt	Negl.	1.7	.5	Negl.	1.3	.4	0	2.9	.7
Region 6. Gulf Coast									
112. Western Gulf Basin	1.2	8.0	3.6	3.0	20.0	9.1	27.8	209.3	92.1
113. East Texas Basin	.3	2.7	1.2	.2	1.9	.8	2.2	13.7	6.4
114. Louisiana-Mississippi Salt Basins	.8	5.0	2.3	.6	4.0	1.9	3.5	34.9	14.1
Region 7. Mid-continent									
115. Anadarko Basin	.7	5.1	2.2	1.6	11.9	5.2	10.2	63.1	29.5
116. Arkoma Basin	Negl.	1.0	.3	.1	2.3	.7	.5	8.1	2.8
117. Cambridge Arch-Central Kansas Uplift	.1	1.0	.4	.1	.7	.3	.2	.9	.4
118. Cherokee Platform	Negl.	1.0	.3	.1	2.2	.8	Negl.	1.2	.5
119. Forest City Basin	Negl.	.1	Negl.	Negl.	.1	Negl.	0	0	0
120. Nemaha Ridge	Negl.	.2	.1	Negl.	.1	.1	Negl.	.6	.2
121. Salina Basin	0	Negl.	Negl.	0	Negl.	Negl.	0	0	0
122. Sedgwick Basin	.1	.6	.2	Negl.	.4	.2	.2	1.3	.6
123. Southern Oklahoma	.2	1.8	.7	.3	4.2	1.6	.4	4.6	1.8
124. Sioux Uplift	0	0	0	0	0	0	0	0	0
125. Iowa Shelf	0	0	0	0	0	0	0	0	0
126. Ozark Uplift	0	0	0	0	0	0	0	0	0
Region 8. Michigan Basin									
127. Michigan Basin	.3	2.7	1.1	.4	3.2	1.4	.9	9.3	3.3

1/ F_{95} denotes the 95th fractile; the probability of more than the amount F_{95} is 95%. F_5 is defined similarly.

TABLE 3. - ESTIMATES OF UNDISCOVERED RECOVERABLE OIL AND GAS IN ONSHORE PROVINCES OF THE UNITED STATES--Continued

	Crude Oil (Billion Barrels)			Associated/Dissolved Gas (Trillion Cubic Feet)			Non-Associated Gas (Trillion Cubic Feet)		
	Low F_{95} 1/	High F_5 1/	Mean	Low F_{95} 1/	High F_5 1/	Mean	Low F_{95} 1/	High F_5 1/	Mean
Region 9. Eastern Interior									
128. Illinois Basin	.1	1.4	.6	.1	.6	.2	Negl.	1.5	.4
129. Cincinnati Arch	Negl.	.5	.2	Negl.	.2	.1	.1	1.7	.6
130. Black Warrior Basin	Negl.	.5	.2	Negl.	.8	.2	.4	2.6	1.2
Region 10. Appalachians									
131. Appalachian Basin	.1	1.5	.6	.1	1.2	.5	5.4	43.2	18.5
132. Blue Ridge Overthrust Belt	0	0	0	0	0	0	0	5.0	1.1
133. Piedmont	0	0	0	0	0	0	0	0	0
134. New England-Adirondack	0	0	0	0	0	0	0	0	0
Region 11. Atlantic Coast									
135. Atlantic Coastal Plain	0	0	0	0	0	0	0	.3	.1
136. Florida Peninsula	.1	.8	.3	Negl.	.1	Negl.	0	0	0

1/ F_{95} denotes the 95th fractile; the probability of more than the amount F_{95} is 95%. F_5 is defined similarly.

The United States has not resolved its offshore boundaries with other States concerned. The lines on this chart are for purposes of illustration only, and do not necessarily reflect the position or views of the United States with respect to the boundary involved.

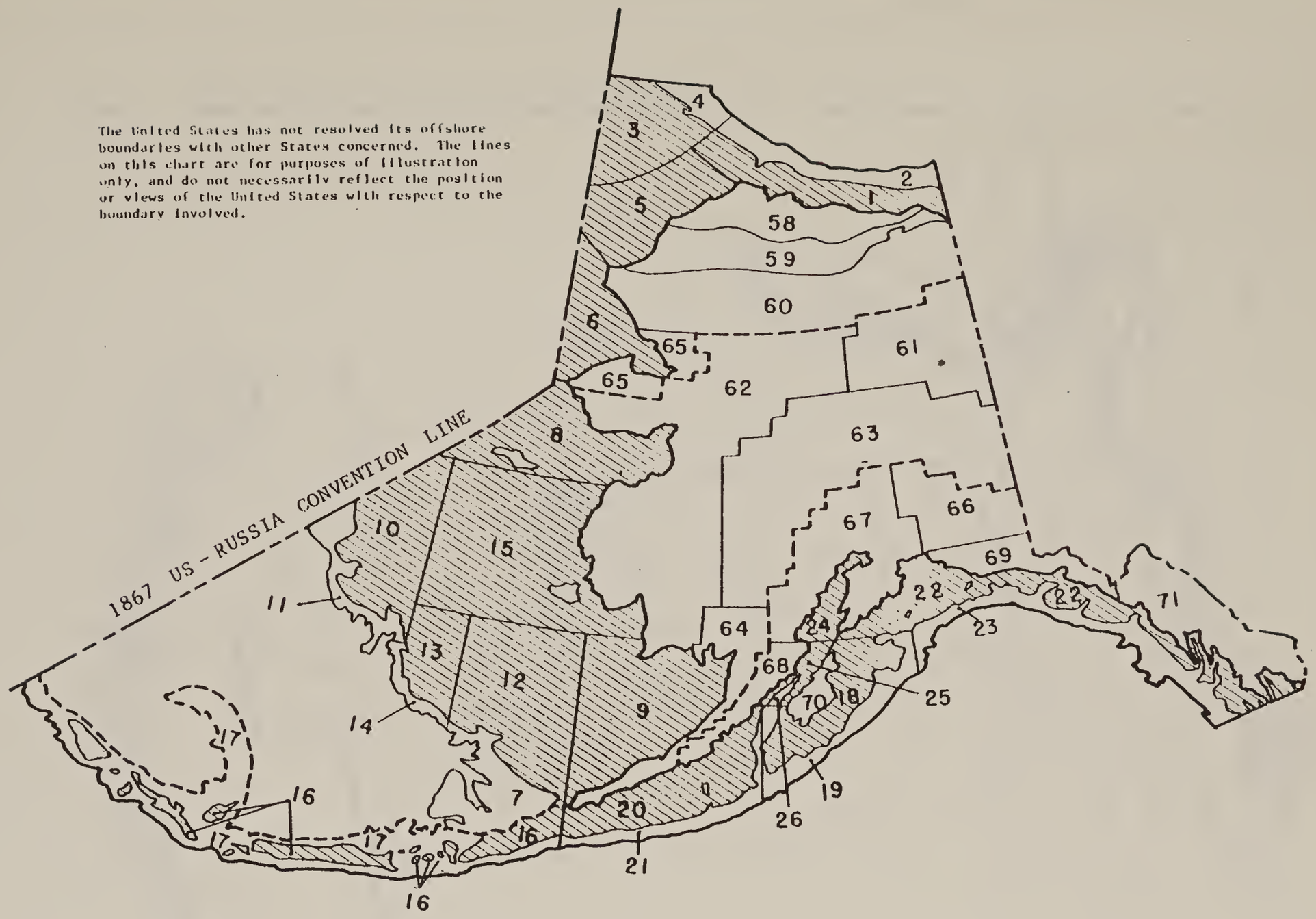

Figure 3. Index map of Alaska showing provinces assessed. Shading denotes offshore shelf areas; names of provinces are listed in tables 2 and 3.

Figure 4. Index map of lower 48 States showing provinces assessed. Shading denotes offshore shelf areas; names of provinces are listed on tables 2 and 3.

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Appendix 3

BUREAU OF LAND MANAGEMENT
OUTER CONTINENTAL SHELF OFFICES (OCS)
AND
AVAILABILITY OF OCS ENVIRONMENTAL STATEMENTS

AVAILABILITY OF ENVIRONMENTAL IMPACT STATEMENTS CONCERNING
OIL AND GAS LEASE SALES ON THE OUTER CONTINENTAL SHELF (OCS)

With the exception of initial review copies to Federal agencies (and a few copies available immediately after release through the BLM Public Affairs Office (130), OCS statements are distributed by the OCS Offices, rather than by the Washington Office. Copies of statements in print may be obtained by writing or calling the following:

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(PACIFIC COAST SALES, EXCLUSIVE OF ALASKA)	
Pacific Outer Continental Shelf Office Bureau of Land Management 1340 W. Sixth Street, Room 200 Los Angeles, California 90017	(FTS) 798-7234 (Com) 213-688-7234
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Alaska Outer Continental Shelf Office Bureau of Land Management P.O. Box 1159 Anchorage, Alaska 99510	(Com) 907-276-2955
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New York Outer Continental Shelf Office Bureau of Land Management 26 Federal Plaza Suite 32-120 New York, New York 10278	(Com) 212-264-2960

Environmental maps may be obtained separately from the statements, at cost, from the OCS offices.

Appendix 4

Deepwater Technology

Prepared by New Orleans
OCS Office, Bureau of
Land Management

INDUSTRY DEEPWATER CAPABILITIES

By Jesse L. Hunt, Jr.
Bureau of Land Management
New Orleans OCS Office
New Orleans, Louisiana

1980

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Introduction

As the "easily accessible" hydrocarbon resources onshore and in shallow water are exploited, the industry must explore in deeper and more hostile environments to help meet society's need for energy. Oil and gas development in these environments will require the use of new equipment suitable for working at such depths; however, the major factor determining the ability to produce oil and gas in deepwater is economics. In order to justify the drastically increased cost of operating in deeper water, substantial reserves must be found. Drilling of exploratory wells to date has been limited to water depths shallower than 1,486 m.

Exploitation of hydrocarbon reserves occurs in several stages: exploratory drilling; development drilling and establishment of production facilities; and transportation of the products.

Exploratory Drilling

The rigs most commonly used for exploratory drilling are drill barges, jack-ups, semi-submersibles, and drill ships. Drill barges are most commonly used in inland waters and shallow offshore waters. Jack-up rigs are limited in water depth by the length of the legs, 100 - 200 m maximum. Semi-submersibles and drill ships are most commonly used for deepwater drilling.

Semi-submersible drilling rigs, also known as column-stabilized drilling units, provide a much larger deck space than drill ships but offer substantially less storage capacity in terms of weight. This is due to the much smaller waterplane area of semi-submersibles as compared to drill ships. Semi-submersible vessels are quite stable; roll seldom exceeds 5° on a properly found vessel, even in the most severe seas. All but one of the semi-submersible drill units utilize conventional catenary mooring systems, which is one of the limiting factors in water depth capability. At present, there are approximately eight semi-submersibles capable of drilling in water depths of 450-610 m, only two are capable of operating in depths of 610-760 m, and one, the SEDCO 709, has a water depth capability of 2440 meters (Hammett, 1979). This vessel is the only semi-submersible rig with a dynamic positioning system and has more horsepower than any vessel (approximately 26,000 HP).

Due to the greater load capacity resulting from the greater waterplane area of the hull, drillships in general have greater capabilities for drilling in deeper water. For deep drilling from a floating vessel, the blow-out preventer stack (BOP) and well controls must be placed on the seafloor. If retrieval of the riser is necessary, the retrieval of all drilling mud in the riser may be necessary. Most drill ships have a greater mud storage capacity then semi-submersible vessels (see Table 1).

The deepest exploration well drilled to date was drilled by the drillship DISCOVERER SEVEN SEAS off Newfoundland in 1486 m of water. Drillships, such as the SEDCO 445, SEDCO 471, SEDCO 472, DISCOVERER 534, DISCOVERER SEVEN SEAS, and NEDDRILL 2 are designed to drill in waters up to 1830 m deep. Most of these types of vessels utilize dynamic positioning systems, although some use conventional catenary mooring systems as well.
One drillship, the GLOMAR CHALLENGER, has drilled in water more than 6100 m deep. This vessel, however, was involved in scientific sampling and drilled without blowout preventer and riser and, therefore, purposely avoided any potential oil and/or gas prone areas.
The [redacted] GLOMAR EXPLORER is currently being converted to a drillship capable of drilling with a riser and blowout preventer in water depths to 3960 m. Current plans are for the GLOMAR EXPLORER to begin drilling for the Ocean Margin Drilling Program in 1984.

Floating drill units make up about 50% of today's mobile offshore fleet. Drilling from a floating platform is very different from drilling on a bottom-supported platform or onshore and requires some very specialized equipment. In any type of drilling, the ability to keep a constant preselected weight on the drill bit is extremely important. To counteract the up and down movement of waves, all floating units have some sort of heave compensator. These units are attached to the traveling block or crown block, and through the use of high pressure air or air/oil, the loads caused by the rise and fall of the vessel are balanced out (Figure 1).

TABLE 1

Comparison of Ship and Semi-Submersible Drilling Units

	Ship Units	Semi-submersibles
Approximate Number Operating	54	119
Initial Cost	$5-65 Million	$5-81 Million
Displacement, Long Tons		
Smallest	5,000	8,000
Largest	36,000	39,000
Normal	11,000	14,000-25,000
Travel/Towing Speed, Knots	6-12	3-10
Natural Roll Period, Sec	8-14	18-33

Typical Storage Capacities of Larger Units

(Long Tons Except As Noted)

Tubular Goods	1,270	490
Sack Mud and Cement	540 (12,000 sx)	230 (5,000 sx)
Bulk Mud and Cement	230 (5,000 sx)	280 (6,100 sx)
Liquid Mud	680 (3,000 bbl)	200 (900bbl)
Fuel	1,110 (8,150 bbl)	610 (4,460 bbl)
Drilling water	2,400 (15,000 bbl)	1,450 (9,100 bbl)
Potable Water	80 (500 bbl)	50 (330 bbl)
Approximate Water Capacity	6,300	3,300 (due to smaller water plane area)

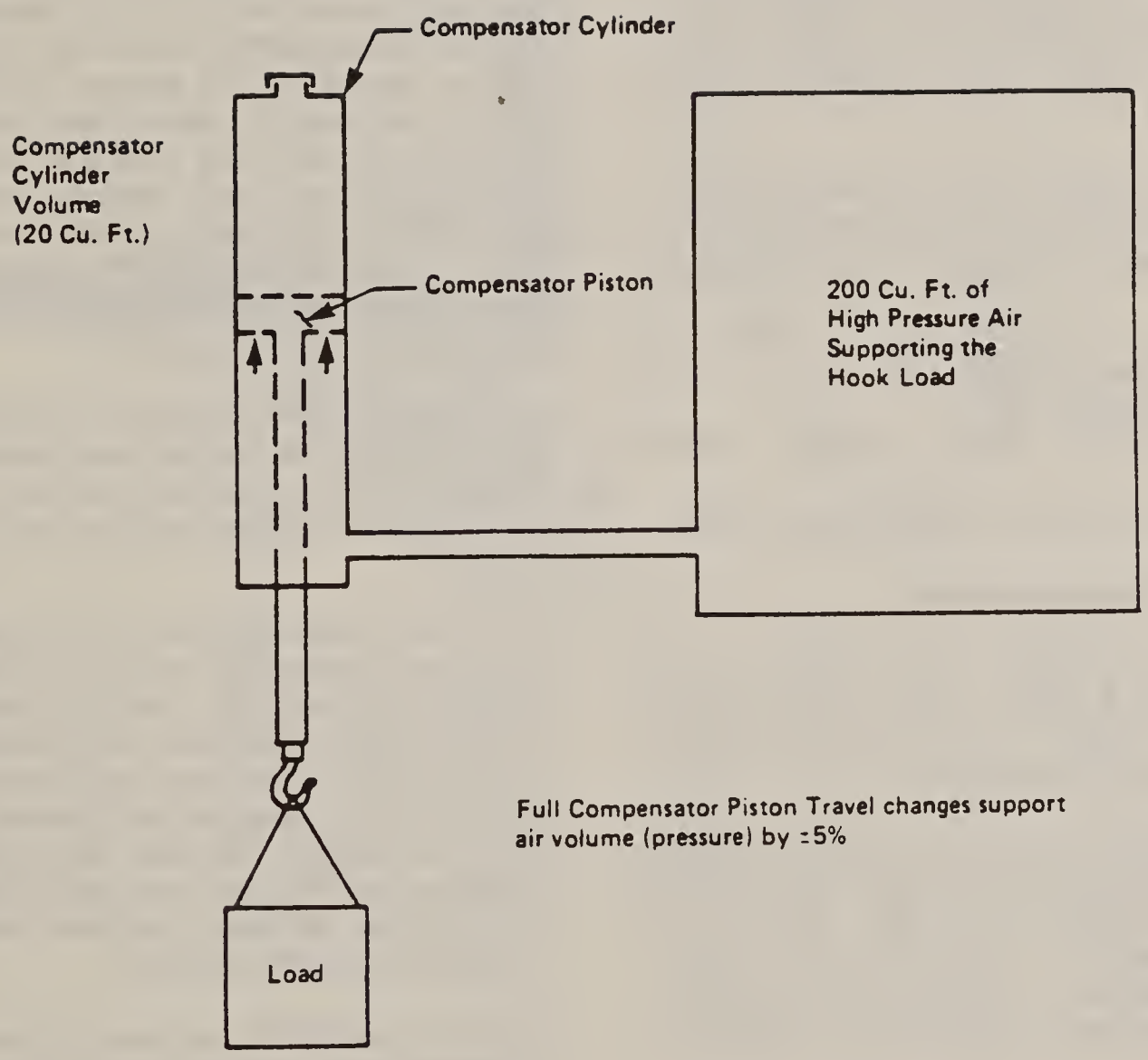


Figure 1. Simple Pneumatic Compensator System

Additional problems are posed by the riser system in a floating drilling operation since it must also allow for the up and down movement of the waves. This problem is mitigated through the use of slip-joints in the riser itself and a riser tensioning system which operates similarly to the heave compensator previously described. If guidelines leading to the subsea blowout preventer and wellhead are used, they also have similar tensioning systems.

Another piece of equipment common to floating rigs is the traveling block guide rails and dolly. This equipment keeps the traveling block, which hangs from the crown block on the derrick, centered over the rotary table and the hole. In addition, floating rigs sometimes have power-assisted pipe racking while bottom supported rigs do not.

Several major design innovations were necessary to allow shallow water drilling technology to be applied to sites in deeper water. Among these were:

- dynamic positioning
- marine riser systems
- electrohydraulic blowout preventer (BOP) controls
- re-entry procedures for guidelineless drilling

Mooring vs dynamic positioning

Mooring systems were a critical factor in the ability to drill in deeper waters. Today's drilling vessels are able to weather most any storm, but the mooring systems are not.

In moderate water depths, chain gives a better catenary action than wire rope. However, in water depths greater than 300 - 350 m, the weight and volume of the bulky chain makes its use prohibitive. In greater water depths, a combination chain and wire rope system is used.

For example, chain commonly used is 2-inch or 2¾-inch. The 2-inch chain weighs approximately 40 pounds per foot and the 2¾-inch weighs 75 - 80 pounds per foot. Wire rope commonly used is 6 x 37 in diameters ranging from 2 to 3½ inches. The 2½-inch wire rope runs approximately 11.6 pounds per foot. (Note since these figures are standards, no attempt will be made to convert this analysis to metric). For 1,500 foot water depths, the horizontal distance from the anchor to the rig in a standard mooring configuration would be approximately one mile. Along the catenary, the distance would be approximately 6,000 feet; therefore, 3,000 feet of 2-inch chain weighs around 120,000 pounds and 3,000 feet of 2½-inch wire rope weighs about 34,800 pounds for a total of 154,800 pounds for each of up to 8 moorings on the rig.

With just wire or chain, 300 m water depth is about the maximum at which a vessel may anchor and drill. Beyond this depth, the mooring system is stressed to the point it can support only its own weight. With the combination system, this maximum depth can be extended out to around 1,500 meters. To date, this system has been proven in only about 1,000 m or less. Besides the weight of the mooring system stressing itself, another factor which limits the water depth in which a mooring can be used is the horsepower rating of anchor handling vessels used to extend the anchors out around the rig.

Dynamic positioning systems use thrust to maintain the vessel on station over the subsea well. Using dynamic positioning, drilling operations can continue in 60-knot winds plus a 3-knot current.

There are currently about 17 drilling vessels equipped with dynamic positioning systems. The SEDCO 445 was the first dynamically positioned drillship and went into service in 1971 (Albers, 1980). Only one semi-submersible, the SEDCO 709, is equipped with dynamic positioning. The SEDCO 709 can carry supplies and equipment to drill in water up to 2,440 m and can continue drilling in 66-knot winds, 17-m waves, and 2.4-knot currents.

Dynamic positioning systems typically consist of four elements: sensors, controller, propulsion, and power plants.

A number of different types of sensor systems are used to detect movement off station, and usually each system has more than one sensor (see Figure 2). Seafloor beacons are placed at or near the wellhead or the seafloor. An array of hydrophones is placed on the drill vessel and feeds into the control computer. Based on time delay, the vessel's position with reference

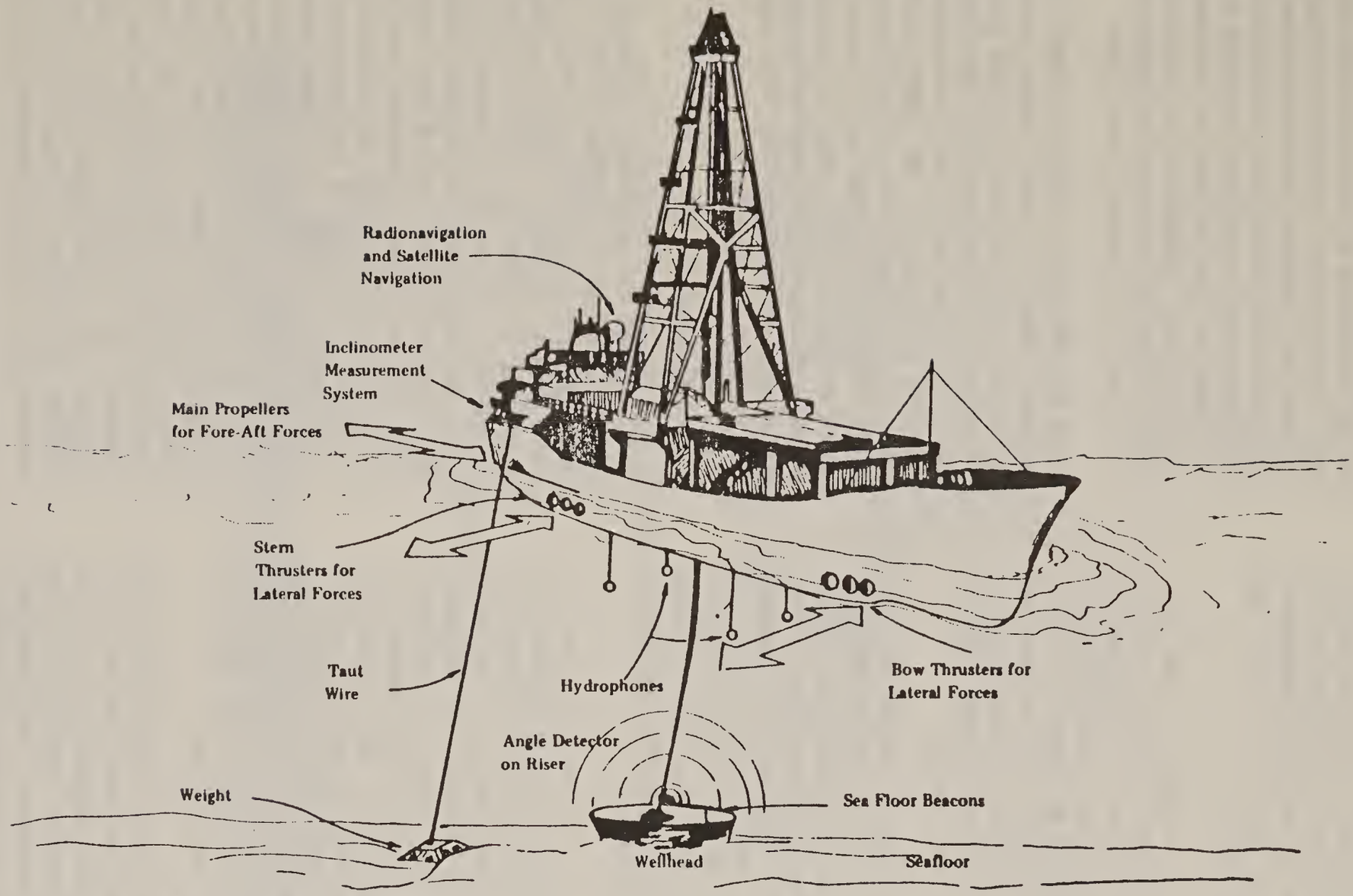


Figure 2. Systems for dynamic positioning

Source: Delco Electronics

to the beacons (and thus the wellhead) is calculated. A very similar system which operates on the same principle utilizes transponders on the seafloor and surface transmitting interrogators on the drillship. The latter system also uses four receiving hydrophones.

Another sensor which feeds into the computer which controls the thrustors is a taut wire system. A weight is lowered to the seafloor, and the wire attached to it is drawn tight (see Figure 3) and maintained at a constant tension. An angle sensor is attached to the taut wire and feeds the angle and direction to the computer if the wire gets out of a vertical attitude. A similar system is attached to the riser pipe.

A vertical reference unit is also fed into the computer. This unit consists of a vertical gyro and measures pitch and roll. Other inputs which can be fed into the positioning system include radio and satellite navigation, wind sensors, gyrocompass, inertial reference unit, and if used in conjunction with catenary mooring, tensionmeters. A "joystick, ' which can manually adjust or override the dynamic positioning, is also available in the control room.

The controller consists of the computer system which integrates all of the input from the different sensors. There are two independent controller units; should one fail the other is automaticaly switched in. The computer which is "on line" also checks incoming information for electrical failures, logic failures, or computational discrepancies. All information is processed and command signals are sent to the appropriate thrusters to apply the proper force in the proper direction to keep the vessel over the well. The computer also has built-in filtering to automatically adjust for sea-wave induced spectrum of vessel motion.

Most vessels use the main propellers for fore and aft forces; thrusters are used for port and starboard forces. Many variables are used in the design of the thrusters. Most range in size from 800 to 2500 horsepower. Two basic types of thrusters are azimuth and fixed. The azimuth thrusters can be rotated to point the resultant force in the desired direction. The fixed type has performed very satisfactorily in conjunction with the vessels main propellers.

Some thrusters are mounted in tunnels through the hull and others are mounted below the hull. Some thrusters have continuously turning controllable-pitch propellers while others are fixed propellers with controllable reversing motors. The thrusters are usually mounted with two or more near the bow and two or more near the stern. They are positioned to maximize the ability of keeping the bow of the vessel headed into the worst environmental conditions.

Power systems used to date have been diesel/generator systems. Several large generators (up to eight) are used to supply peak power to not only propulsion systems, but to drilling and support systems as well. Vessels are designed to have one generator over and above those required to meet peak loads. In the case of the SEDCO 709, these generators provide some 26,000 horsepower. Fuel usage on a vessel such as this in the dynamically positioned mode averages around 100 tonnes per day (700 barrels per day).

Marine Riser System

When drilling in deepwater, the riser itself presents some special problems and is generally the limiting factor in deepwater exploratory drilling capability. Risers are designed to be held in tension to prevent buckling. In shallow water, tension can be maintained by the drill vessel from above. In deepwater, however, the marine riser must support the column of heavy drill mud inside it; therefore, very strong and heavy pipe is required (usually grade X-52 or HY-80, up to 80,000 psi minimum yield strength) and keeping all of this weight in tension presented a problem. This problem was solved by attaching special buoyancy elements to the riser (see Figure 4). Another problem that surfaced was that under the compression of water pressure at great depth the buoyancy elements lost some of their effectiveness. A firm (Emerson and Cuming), however, has now designed and tested marine riser buoyancy modules for 3,650 m of water. Syntatic foam modules rated to 2,740 m are now operational.

Another riser-related weakness which in the past has hampered deepwater drilling was in the coupling. Couplings were only about one-half as strong as the riser pipe and were frequently the

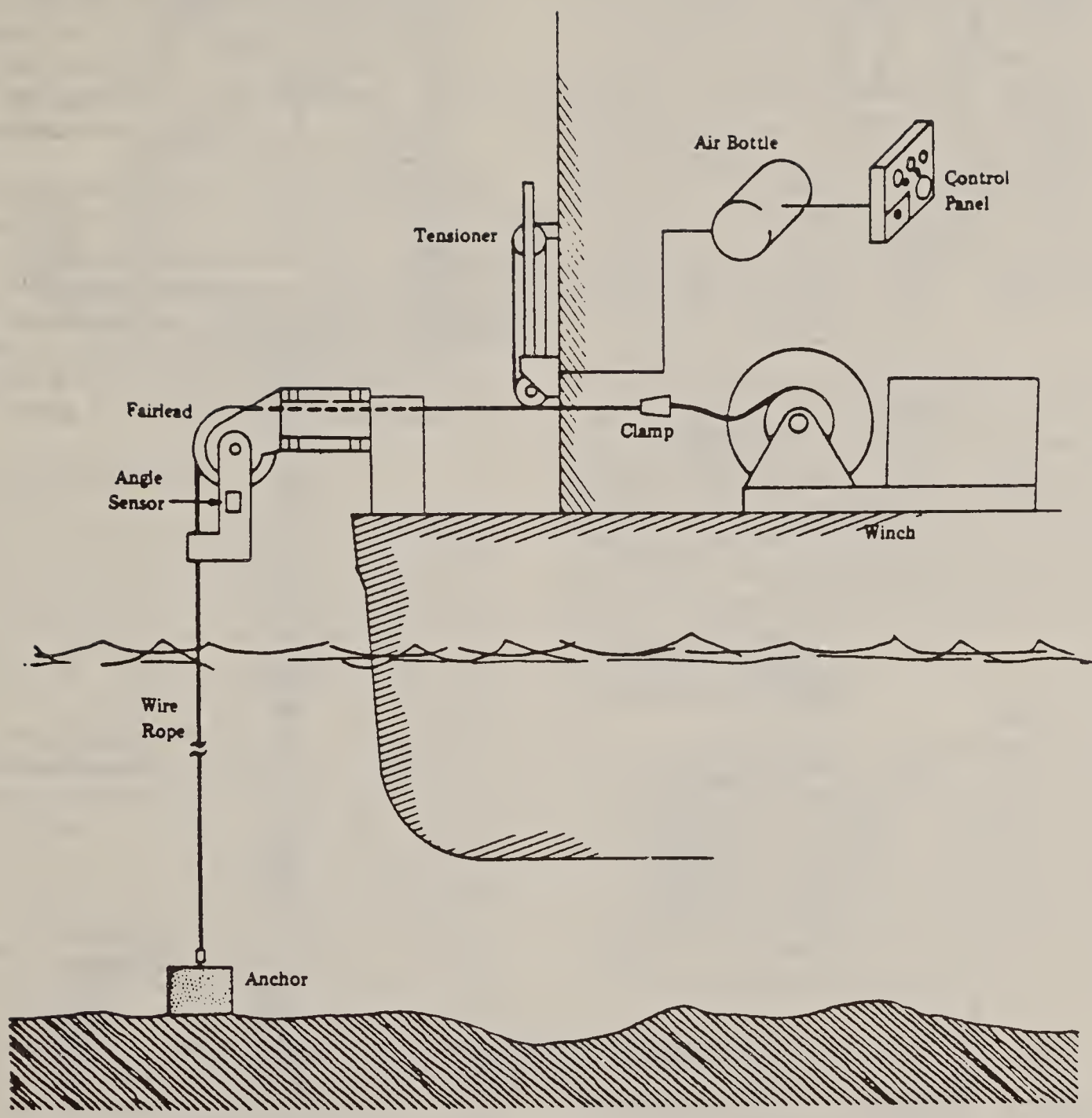


Figure 3. Taut-Wire Schematic

Source: Delco Electronics

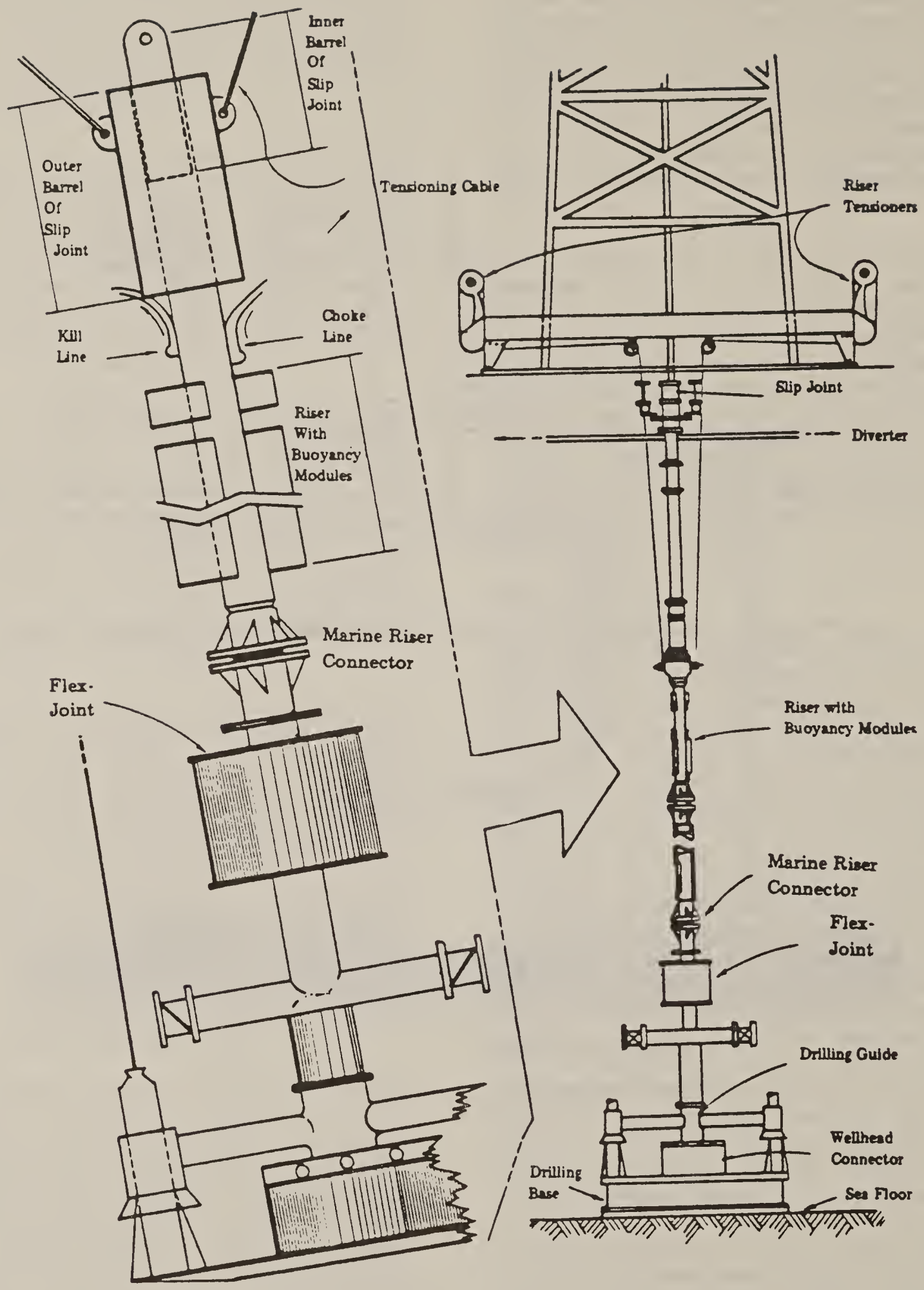


Figure 4. Marine Riser Assembly

cause of failures. Several new couplings have been developed which are of greater strength than the body of the riser.

The riser is connected to the sub-sea wellhead through a flex-joint, which allows up to 10° of angular movement of the riser with respect to the wellhead (see Figure 4). In general, operations are terminated if the flex-joint angle exceeds 3.5°.

One detail shown in Figure 4 is the diverter system which is above the slip-joint. If high-pressure gas is encountered in the shallow subsurface and the well is shut in, it might crater out around the conductor pipe. Therefore the gas would be allowed to come up the riser and diverted out to the side of the drilling vessel.

Blowout Preventer Controls

The blow-out preventer (BOP) is a device through which wells are drilled to prevent high pressure gas or oil from getting out of control and blowing back out of the hole. The BOP consists of three or more hydraulic pipe rams near the bottom which can seal around the drill pipe (see Figure 5). The upper set of rams are the sheer rams. These rams shear off the drill pipe and seal the hole. Usually above the shear rams is a device called an annular preventer, which is a "doughnut" shaped packer or bladder which can be hydraulically inflated to seal off around any tubular which might pass down through it. There is also a choke and kill system which utilizes two lines that go into the BOP at a level below some of the rams. One, the "kill line" is used to pump heavy fluids down the hole to force any high pressured oil or gas back into the formation, "kill" the well. The second, the "choke line," is used to circulate with control drilling fluids in the well when the BOP is shut-in (when the rams are closed). The BOP used in deepwater drilling is placed on the seafloor and is attached to the wellhead via a hydraulically actuated connector. Most BOP systems are rated to about 10,000 pounds per square inch (psi).

Rapid response of the rams is often vital in controlling a kick. In shallow water or onshore, simple hydraulic systems offer adequate response times. However, in deepwater, this response time is too long. For example, to close the BOP rams in 1,800 m of water with a conventional control system might require around 65 seconds. To alleviate this problem, an electro/hydraulic BOP control system has been developed which utilizes electricity to operate pilot valves to direct the hydraulic power fluid. The response time in this system is reduced to about 23 seconds. A further refinement of the electro/hydraulic system is used in ultra deep waters and involves the use of multiplexed electrical signals. Multiple electrical signals can be coded and sent along the cable simultaneously. This system reduces the size of the electrical cable needed from about 2-inch OD to about 1-inch OD and can handle some 100 seperate functions as opposed to about 40 functions for the multiconductor system (Hammett, 1979).

To attain instant response when the pilot valves are actuated, reserve accumulators are often used on the BOP (see Figure 5). These are high pressure metal bottles which contain a rubber bladder. To charge one, the rubber bladder is prepressured with nitrogen (N^2). The tank is then filled with the hydraulic fluid, and the rubber bladder is compressed to a pressure of around 3,000 psi.

Guidelines Re-entry

In shallow water drilling, guidelines are used to guide the BOP, lower marine riser package, etc. down to the wellhead. In deepwater the weight of the guidelines themselves make them prohibitive. Therefore, a re-entry technique was developed using acoustic (sonar) instruments and underwater TV systems without guidelines to find and re-enter the wellhead.

Drilling in Currents

Strong currents that further complicate the intricate task of reentering a subsea wellhead in deepwater are often encountered at drilling sites all over the world. In 1978 Sedco's drillship SEDCO 472, completed an exploratory drilling program for Esso Exploration in a deep water area off the northern coast of South America where the South Equatorial Current flows from east to west approximately parallel to the coastline. The deepest water depth drilled was 1,200 m and surface currents of 3 knots were encountered. In order to successfully complete the drilling program, an intensive research and engineering effort was undertaken to solve some new problems that this environment presented. The results were presented by Shanks, et al., 1979.

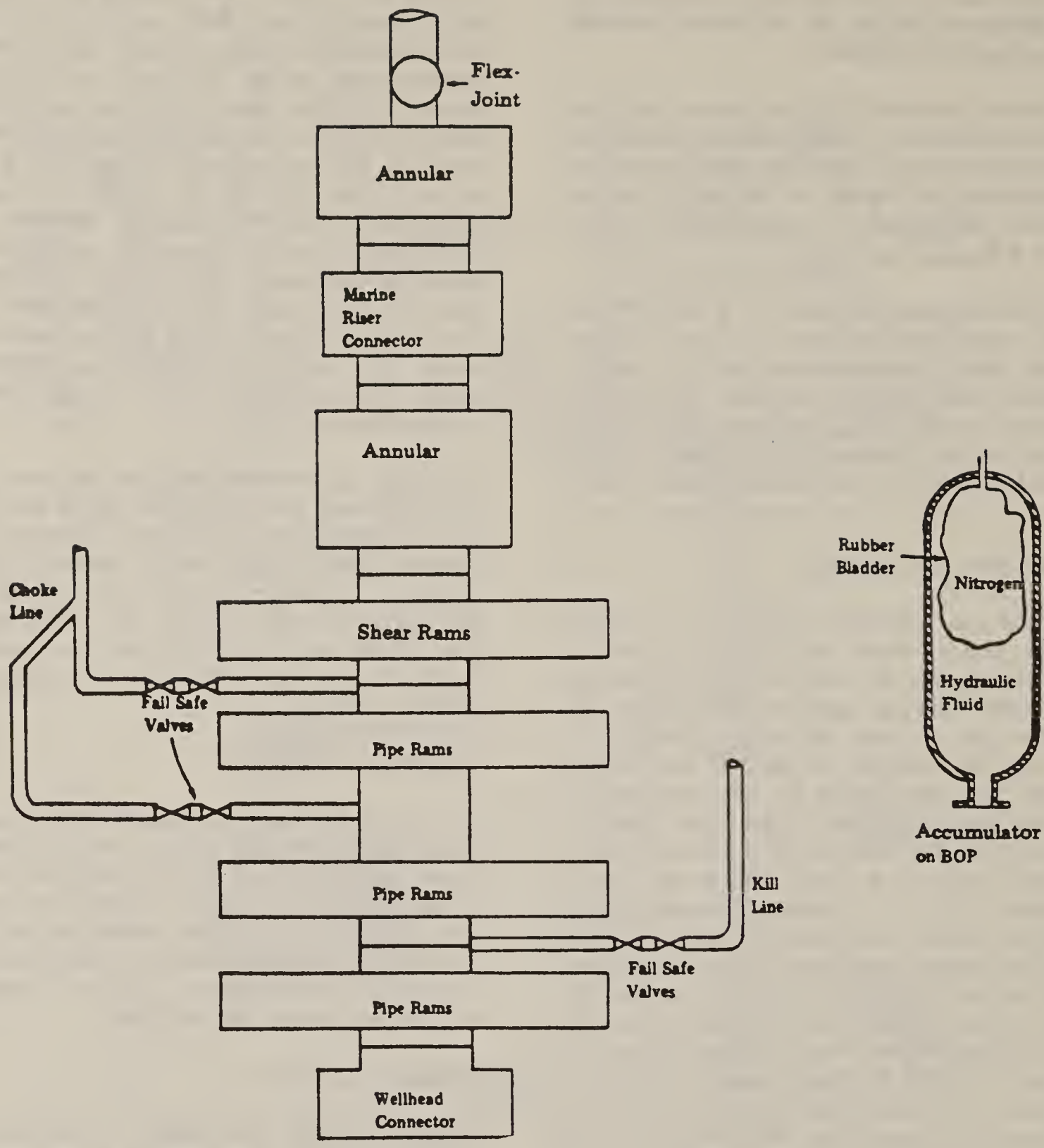


Figure 5. Subsea Blowout Preventer (BOP)

The first problem was the possibility of riser recoil. Floating drilling vessels, and particularly those which are dynamically positioned, incorporate an emergency disconnect sequence to allow the vessel to disconnect the riser from the BOP at the seafloor. The sequence takes approximately 30 seconds, during which time the well is closed off and the choke and kill stabs, etc., are retracted. Tension is maintained on entire riser string during drilling to prevent buckling due to compression. Furthermore, the riser is kept at approximately neutral buoyancy. If the riser were not controlled during disconnect, it would be drawn upward until the slip-joint collapsed and the energy would then be transferred by impact to the structure of the drilling vessel. To prevent this sequence from occurring, a system of valves and accumulators were added to the existing tensioner system which creates a closed system. Initial pressures are added to the system to balance the weight of the riser so that the system comes into equilibrium shortly after the riser has lifted off the BOP. Once lift-off has occurred, a "cushion" is provided to reduce stresses on the riser caused by the up and down motion of the vessel in the waves.

The next problem was to minimize stress in the riser caused by current. Computer runs showed that a high-stress area appears in the marine riser just below the water surface. This is usually where the current is greatest and produces the greatest action on the riser. Bending moments result which are strong enough to cause concern. To alleviate this threat, a flex-joint was added to the riser just below the slip joint and flexible hoses were installed to allow the choke and kill lines, and hydraulic supply lines to bypass the flex-joint. In addition to relieving this stress, the flex-joint could prevent loss of the riser should the angle of deflection in the riser become so great as to cause it to contact the sides of the moonpool.

Were the riser to contact the sides of the moonpool, the riser could not be raised or lowered without damaging the riser buoyancy material. As a remedy for this problem, a structure was installed below the rig floor at the moonpool level. This structure, called a riser restraint system, pivots, slides forwards and backwards and is capable of providing a force on the riser in the direction of the center of the moonpool. Axles with four pairs of 41-inch diameter truck tires were mounted on the structure. The top pair was mounted such that the center of the pair coincided with the centerline of the riser. Two pairs were mounted 1.1 m below the top pair, and were mounted to make a 45° angle to each side of the upper pair. The bottom pair was mounted 2.2 m below the middle pair and in line with the upper pair. The objective of this system was not to keep the riser in the center of the moonpool, but rather to keep the angle low enough to prevent damage to the buoyancy modules and keep the load applied to the riser within acceptable limits.

Reconnection of the upper part of the BOP (upper stack), to the lower stack after the disconnect sequence was another problem caused by current. A guideline less system was used in this program along with a tool called a Latch Bumper Head (LBH). A simplified version of re-entry procedure in high current conditions is described as follows:

> First, the lower marine riser package, riser, and slipjoint are run and suspended from the riser tensioners. The LBH is made up and run inside the riser, and a television/sonar tool is run and landed in the LBH. The BOP is located with the television/sonar tool, and since the riser string is deflected by the current, the LBH and lower marine riser assembly are positioned over the BOP stack funnel by maneuvering the drillship. As the riser assembly approaches the BOP, the LBH is lowered on the running string until it stabs into and engages the marine riser mandrel, and automatically locks into place. The riser assembly is then lowered on the tensioner until it is within about 3 m. Using external stack-mounted TV, and prior orientation of the riser with respect to the ship at a given heading, the riser is rotated until final alignment with the BOP stack is achieved. The riser package is then lowered into place with the tensioners and hydraulically locked into place. The television and LBH are then recovered and drilling can commence.

Finally, a subsea choke was developed which puts the well control choke manifold on the first joint of riser above the BOP and eliminates the adverse effects of trying to control a well through thousands of feet of small diameter pipe.

Exploratory Well Records

As technology advances, deepwater exploration drilling records are being broken almost yearly. In 1969 Exxon drilled several wells in waters deeper than 300 m, one of which was in almost 400 m of water off California. In 1970 Exxon drilled another well off California in 456 m. Shell broke Exxon's record with a well drilled off Gabon in some 633 m of water in 1974. Shell drilled another well in the same area at a depth of 698 m in 1975. Then in 1976, the depth record was extended to 1,055 m by Esso Exploration off Thailand. In 1977 Esso Exploration broke their own depth record with a well drilled off Surinam in 1,204 m. Getty, as operator for the Seagap Group and Hydro-Congo, extended the depth record to 1,325 m off the coast of Congo in 1978. Again in 1979, Getty established a new record with a well in the Mediterranean off Barcelona, Spain, in 1,353 m using the drillship DISCOVERER SEVEN SEAS. Getty's record did not last for long. On April 28, 1979, Texaco, along with several other companies, spudded in a well with the DISCOVERER SEVEN SEAS in 1,486 m of water off St. Johns, Newfoundland. This record still stands.

Completion and Production

The major limiting factor in the exploitation of hydrocarbon reserves in deepwater is not in drilling, but in completion and production. Two methods of production are possible in deepwater. One concept utilizes-subsea completions and the other uses compliant platforms.

Subsea completions may be necessary in water depths too great for conventional platforms, and perhaps for some compliant structures. Subsea completions also augment conventional platforms by: 1) developing parts of smaller structures and allowing gas or water injection in the periphery of a structure; 2) allowing the development of fields not economically viable with a conventional platform; 3) providing early production allowing improved initial cash flow.

The first known underwater completion in North America was made in 1943 in Lake Erie. Since then over 300 subsea completions have been made in Lake Erie in less than 26 m of water. Subsea production technology has been under development since the early 1960's in the Gulf of Mexico. These wells are controlled by hydraulic or electrohydraulic systems, serviced with pressure activated tools through the flowline and have downhole automatic shut-in systems. Between 1960 and 1974, 106 subsea completions were made worldwide.

In completing most of the wells, the equipment used require divers. The current working depth limit for a diver is approximately 460 m, and this requires 12-14 hours to pressurize the diver to depth. The diver is allowed three hours lockout working time. About 10 days are required for decompression. Depending on the individual, 30 days can be spent pressurizing, working, and decompressing. This procedure is very expensive and time consuming.

In order to reduce the need for divers, techniques have been developed for installation of subsea completions from surface vessels. There are two types of subsea completions now in use. The first type, called a wet tree, consists of either a single wellhead or multiple wellheads on or below the ocean floor on a template (Figure 6). The second system consists of a wellhead enclosed in a chamber at one atmosphere of pressure (Figure 7). The chamber allows a man to work on the well in a shirt-sleeve environment. The advantage to the dry completions is that well control lines and the flowline can be connected from inside the chamber. The wet tree requires connections to be made on the outside by a diver, submersible, or surface guideline—a costly proposition in deepwater depths. Water depth is not a critical factor in the dry completion because the wall thickness of the chamber can be increased to withstand greater pressures. According to one industry expert the current limit to operating depths without divers is the ability to service the installation and the completion from surface vessels. Lockheed can service to 365 m with a tethered submersible. The development of umbilical cables to depths of 610 m is underway. The world record depth for commercial wellhead completions is now 189 m.

Wet tree completions have been installed and are in production in various parts of the world. One system, shown in Figure 6, is in use in the

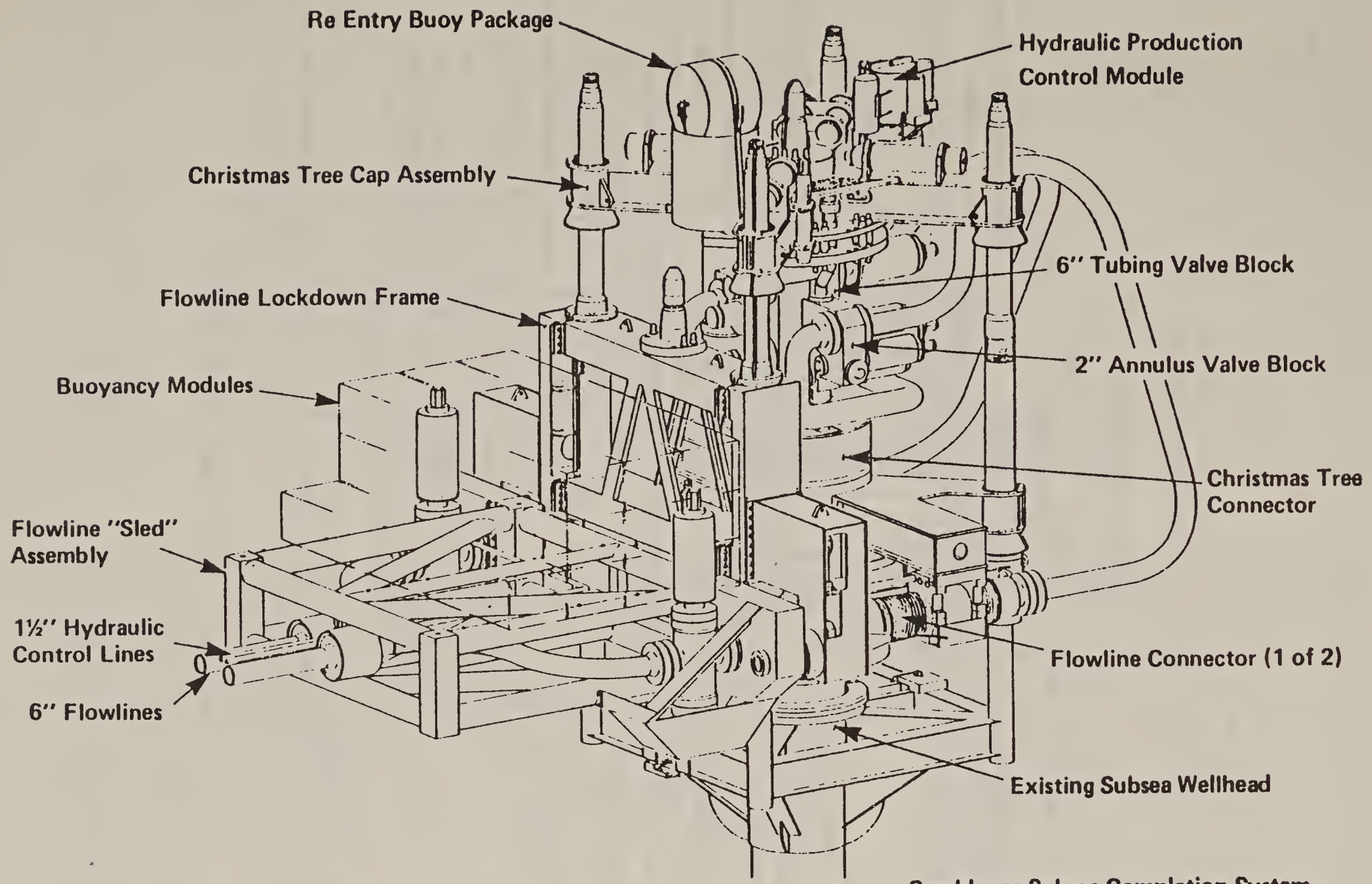


FIGURE 6 WET SUBSEA COMPLETION

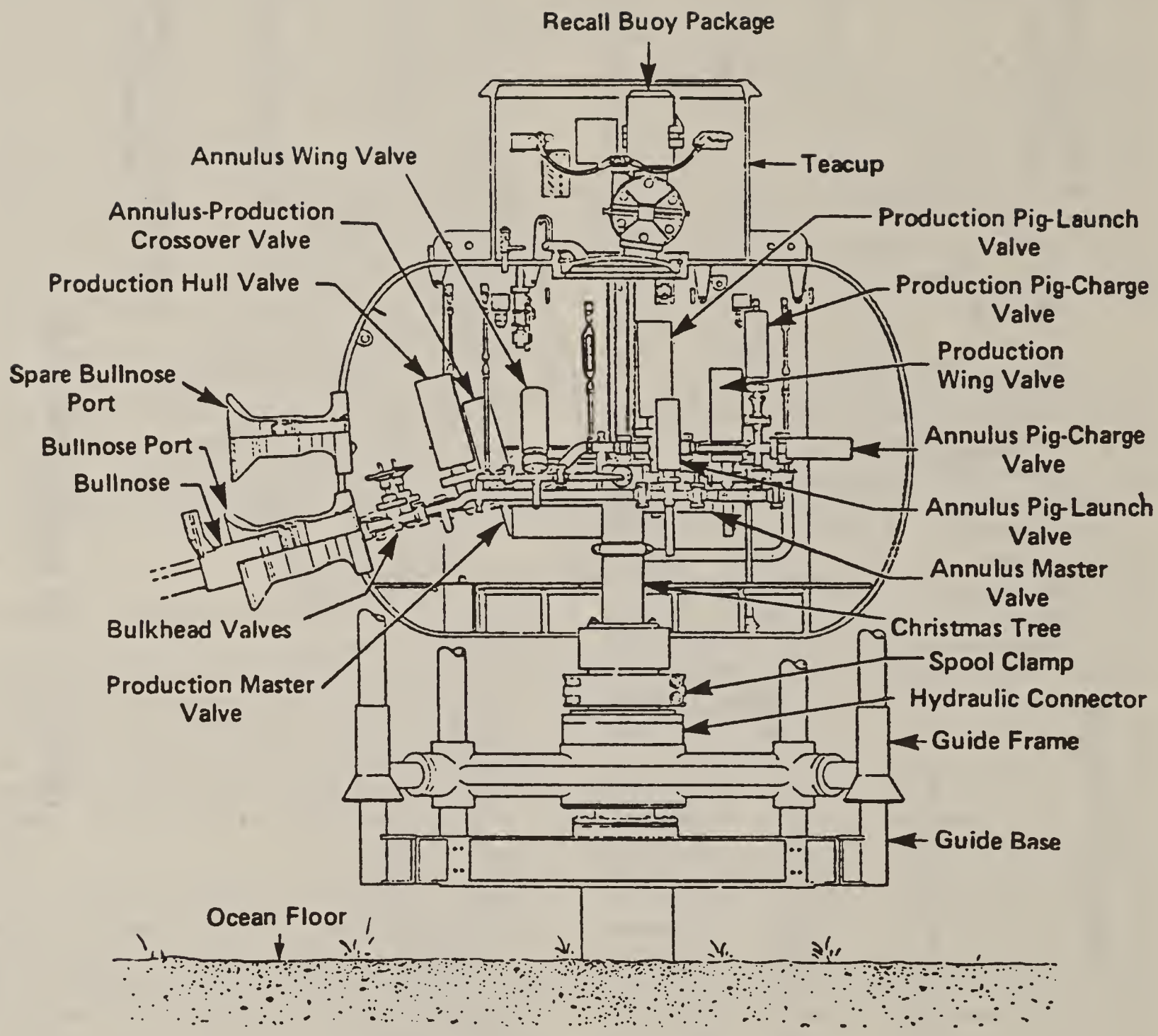


FIGURE 7 DRY SUBSEA COMPLETION

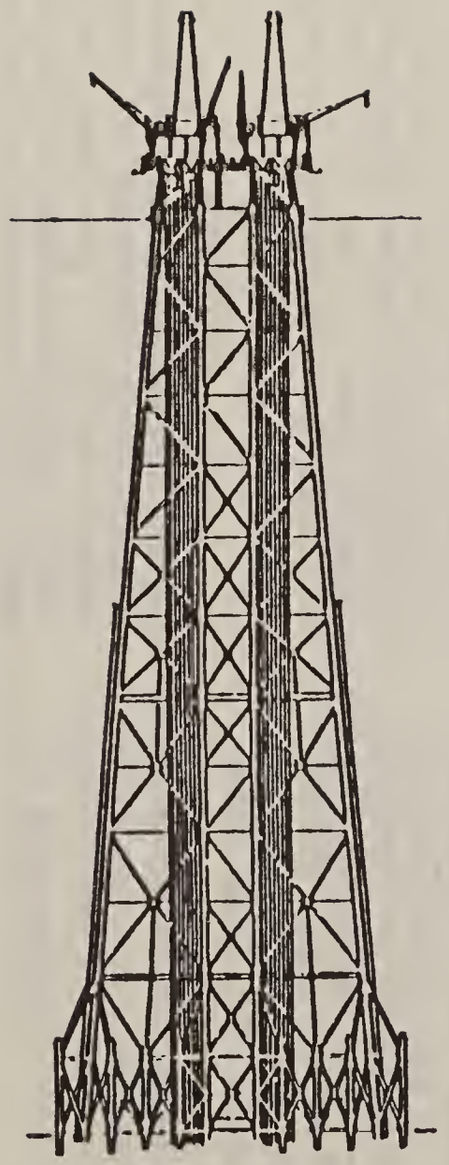
Casablanca Field in the Mediterranean Sea south of Barcelona, Spain, in 120-150 m of water. The system is designed for diverless installation with manipulator back-up. The installation of this system was accomplished without diver assistance. A tubing head adapter with four guide posts was lowered down the four guidelines attached to the existing subsea wellhead. This unit was then locked into place hydraulically and pressure tested. Then, a modified BOP stack was lowered on the guidelines and guided into position by the guide posts. It was then locked down onto the tubing head adapter with hydraulics. At this point, the tubing hanger, downhole equipment, and well tubing were installed and the well was temporarily plugged. The BOP was then removed and the Christmas Tree (wellhead) assembly was run, landed and locked into place and tested. A lower riser package containing hydraulically-operated completion and workover controls was used to attach the Christmas tree assembly and after the assembly was in place, the lower riser package was retrieved. A flowline pull-in tool and lockdown frame were then lowered and locked into place on two of the guide posts. The flowlines were connected to a "sled" which was attached to wire ropes from the pull-in tool and the sled, with the flowlines, was pulled into position in the lockdown frame. Hydraulically-actuated wedges were driven home locking the sled to the lockdown frame. The wires were cut off remotely and the pull-in tool was retrieved. The lower riser package was relowered and locked into place on top of the Christmas tree. Flowline connectors were extended, locked, and pressure tested. Both tubing plugs were pulled and the well was brought into production. When servicing is required, a pop-up buoy is remotely released. The design lifetime for the system is 20 years. With the exception of the control system, the unit may be left on the seafloor for 20 years. The control cap is designed for a service interval of five years. Several similar systems are also in production in the North Sea.

Seal-Comex, a service company, is currently conducting an economic study for Mobil Oil Corporation for installation of a subsea production system in the East Breaks Area, offshore Texas. This Maniford Center has been tested for four years and is now being considered for installation in water depths of 305-365 m.

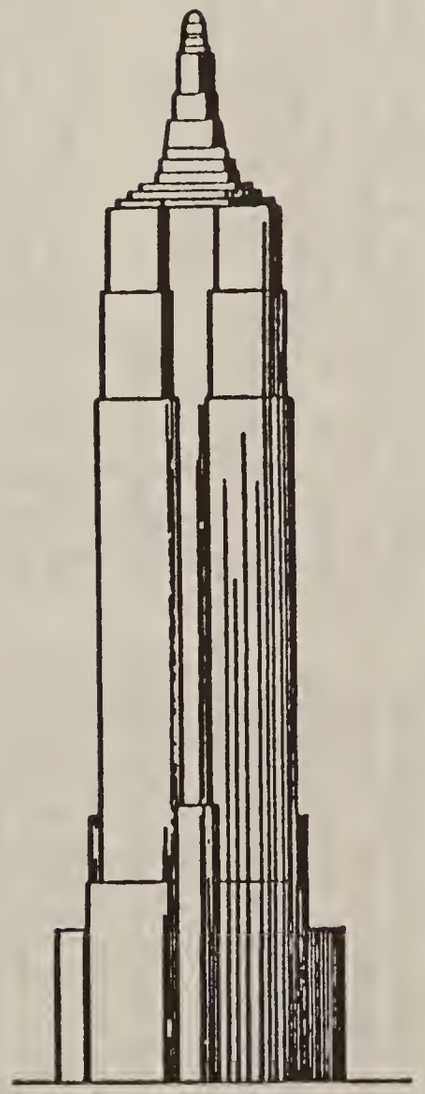
In October 1974, Exxon installed a Subsea Production System 27 miles southeast of Grand Isle, Louisiana, in 52 m of water. The system was installed, controlled, and operated remotely utilizing equipment and diverless techniques suitable for producing oil and gas in water depths of approximately 600 m. A major component of the system is called a maintenance manipulator. When needed, this robot can be lowered to the template and moves around the unit on a track. The manipulator has a system of underwater television cameras built in so the operator on the surface can control its movements. Initial production began in February 1977.

If a subsea completion is not used for deepwater production, then some type of platform is necessary at the site. In shallow waters, conventional platforms have become the industry standard for production. From these platforms a number of wells are typically drilled, and the wellhead completions are on the platform and not on the seafloor. The maximum depth to date for the installation of a conventional platform is 312 m by Shell Oil Company's 46,000 ton Cognac platform 24 km south of the mouth of the Mississipi River (see Figure 8). The platform stands 386 m above the seafloor and 73 m above the surface of the ocean. It will have a record 62 wells. The base section was installed during the summer and fall of 1977; the other two sections were installed in the summer of 1978. Initial production began in late 1979.

In an effort to reduce the amount of steel required, and thereby the price, Exxon, as well as Mobil, Union, and Amoco, are actively involved in designing a guyed tower for use in 300 m water depths (Figure 9). This structure would be bottom-supported and held upright by 16 guys, four at each corner. Moorings are designed for the life of the structure (a minimum of 20 years). The deck of the structure would be able to move up to 40% of the wave displacement (2 - 3 m in a storm). In October



Cognac Platform
1265'



Empire State Building
1250'

Figure 8. Cognac Platform, Offshore Louisiana
Source: Shell Oil Co.

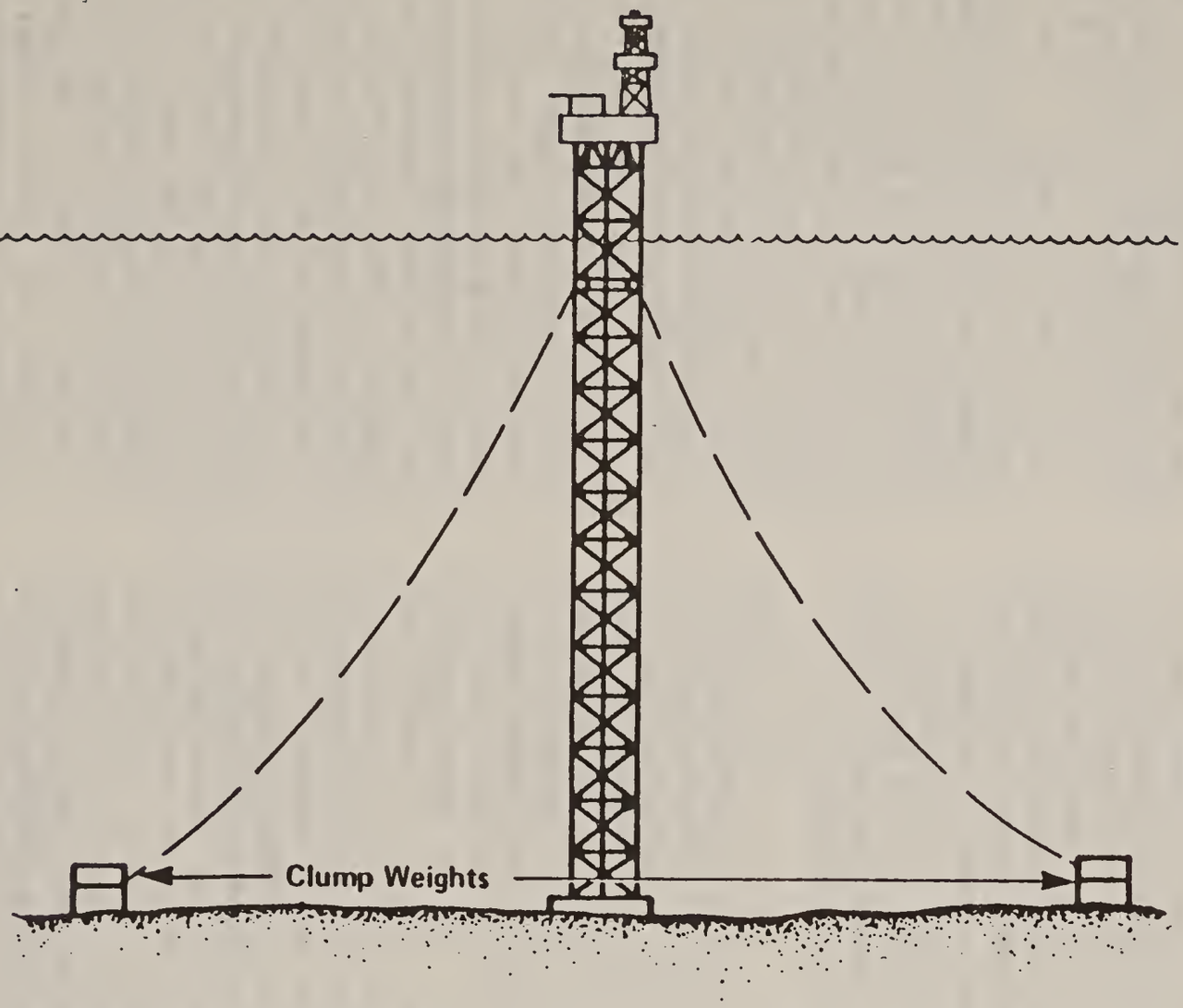


Figure 9. Guyed Tower

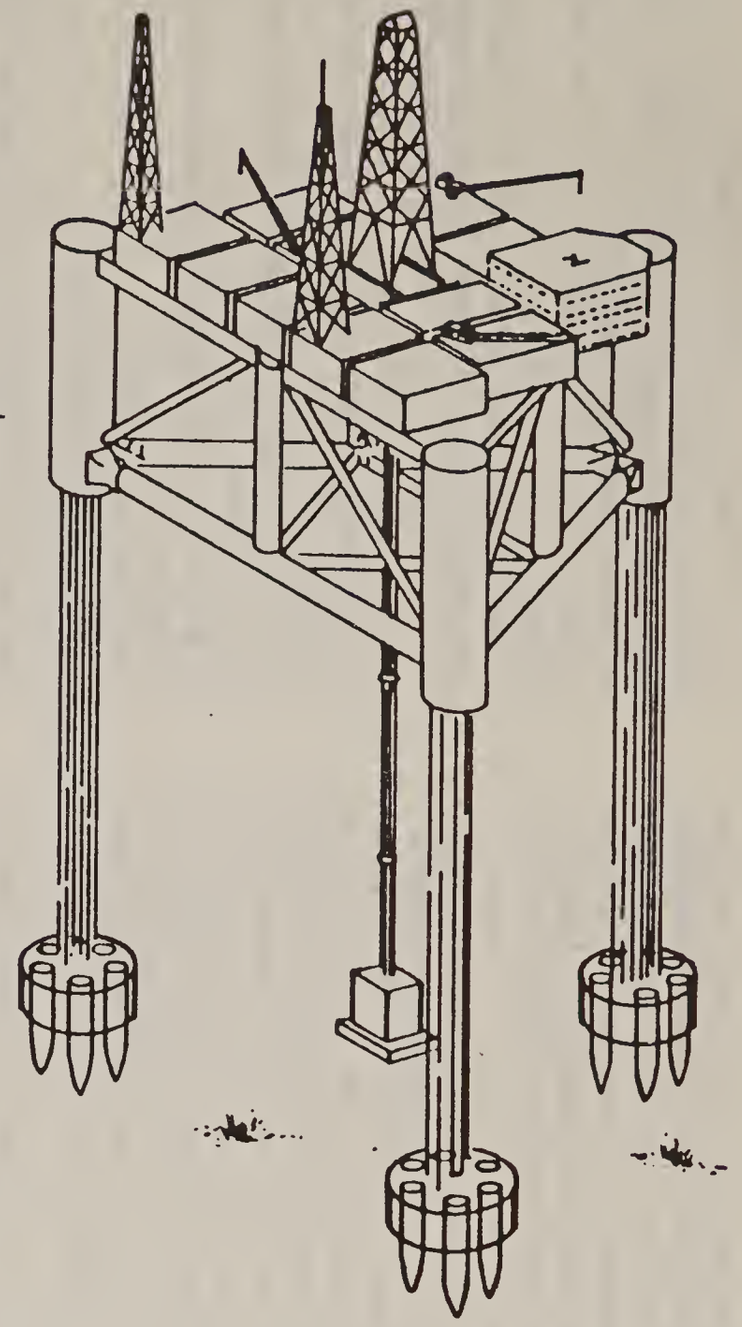


Figure 10. Tension-Leg Platform

1975, Exxon installed a one-fifth scale model of a guyed tower in 100 m of water off Grand Isle, Louisiana. The tower was highly instrumented, and over two years of data confirm that the guyed tower is a feasible and practical platform concept for water depths of 200 - 600 m.

Exxon has gone ahead with this design and is now planning to install a guyed tower to develop their Lena prospect in Mississippi Canyon blocks 280, 281, 324, and 325. Water depth at the site is about 300 m and the platform will have 50 slots. It will be supported by a foundation of pilings and buoyancy tanks will be built into the frame. The tower will be held upright by guy wires attached to clump weights which will be fastened to anchor piles by chain. Current plans are to install the tower in 1983.

Another concept in production facilities for deepwater is the tension leg platform (TLP) (Figure 10). The TLP is a floating structure which is held down by essentially vertical tension members which remain in tension regardless of cyclic loads due to current, wind, and waves. This design is a compliant structure; it is able to move with waves and currents to a tolerable extent. In 1975 Deep Oil Technology, Inc. installed a prototype instrumented TLP in some 60 m of water off California.

Conoco and Amoco will be the first to install a TLP production system when they place their design in 148 m in the North Sea. The initial design work has been completed and has been approved by the British government for installation in the Hutton Field some 95 miles northeast of the Shetland Islands. The structure is a six leg semi-submersible design which will use anchor piles to anchor the tension members. Tension members will be 9-inch diameter rods with a 3-inch hole in the middle; there will be four tension members on each corner, and each will have about 1,000 tonnes of tension on it. The system is designed so that tension members can be retracted one at a time into the legs for maintenance. The platform will have 48-well slots - 24 for initial development, 13 for production, and 11 for water injection. The 48-well seafloor template is scheduled for installation in the summer of 1981; a rig will then drill 8 producing wells and one injection well before the floating superstructure is installed in the fall of 1983 (Petroleum Engineer International, 1980).

The advantages of a TLP are as follows:

- much less material required for construction than a conventional platform
- the vessel can be fabricated and joined in the yard
- deck and hull are constructed separately and concurrently (at different yards if necessary)
- all the major lifting is done onshore avoiding the extremely high costs of derrick barges
- foundation (template) can be installed separately
- weather sensitive periods for installation are much shorter
- shorter time between installation and production
- wells can be predrilled
- lower abandonment costs.

Semi-submersible drill rigs have also been used as floating production platforms. In June 1975, the Hamilton Brothers first produced oil from their Argyll Field in the United Kingdom sector of the North Sea using the converted semisubmersible TRANSWORLD 58 connected to a seafloor manifold and anchor base by a composite riser. Six satellite subsea-completed wells currently produce to the subsea manifold in 79 m of water. After on-board processing, the gas is flared and crude is pumped back down the composite riser and to a single buoy mooring system nearby for shipment by tanker. There are currently about 18 semisubmersible units worldwide which have been converted to other uses, including three for oil production.

Although drilling riser technology, subsea completion technology, and floating platform technology have been recently extended to beyond 1,000 m, production risers along with remote flowline connectors represent the critical development component associated with deepwater production systems. The deepest floating production riser system presently in service is that of the Argyll Field in some 76 m. The composite riser in the Argyll Field is vessel-supported and consists of a central structural riser surrounded by a number of smaller independent satellite risers. The central riser, which in this case carries the low pressure crude to the seafloor and then to a single point mooring for shipment, is designed to withstand the axial and flexural stresses generated by tension, wave action, vessel offset, and current. This structural riser would also receive the

buoyancy modules in very deep water. There is little doubt that a vessel-supported composite riser system could be designed to operate in 1,000 m. A major question, however, is whether the proportion of time that wells would be shut-in would be economically acceptable. The avoidance of frequent shutting-in of production during inclement weather would require specialized facilities.

Another concept for improving production efficiency and re-entry in water depths greater than 365 m is the free-standing composite riser (Figure 11). This system consists of a composite riser fitted with a buoyancy element to provide necessary support to the riser in the disconnect mode, and a remote connect/disconnect stab located at a depth of approximately 100 m in order to put it below the wave action but still within reach of divers. Guidelines from the buoyancy element at the top of the riser to the surface vessel would facilitate a diverless connection.

Another riser system which offers an extremely bright outlook for future deepwater production is the articulated riser system used for Exxon's Submerged Production System (SPS) (Figure 12). This riser, along with the system, underwent tests beginning in 1975 in the Gulf of Mexico. The system consists of a base on the seafloor to which all the flowlines run. The lower 300 m (for a system designed for 500 m) consists of a tension member which also provides a housing for the flowlines and which is supported by a buoyancy element. Unlike the free-standing composite riser, there is no provision for an emergency disconnect at the buoyancy chamber level. The SPS riser is designed to withstand maximum sea states and currents and remain connected. The upper 200 m consists of two 100+ m long sections joined in the middle and at each end by articulated joints. At the surface, the articulated joint is attached to a surface mooring buoy with a permanent yoke attached to a production vessel, probably a converted tanker. The surface mooring buoy locates and supports the upper end of the riser. Each segment has adjustable buoyancy to provide the desired support. Exxon feels that this system would be operable in depths to 1,000 m.

The fourth system, designed by Deep Oil Technology, Inc., is for use with a tension leg platform. This system consists of individual risers specifically designed to take advantage of the inherent stability of the tension leg platform. The platform and risers would be designed to withstand maximum environmental conditions without the need to disconnect the risers. The upper termination of the risers is on the cellar deck level of the platform where the production trees and wellheads are located, much like a conventional platform.

To be viable, deepwater production systems must relinquish dependence on diver assistance and convert to automated techniques. Man's diving capabilities in deepwater are quite limited. Although submersible vessels exist that provide a 1-atmosphere environment for man to any depth, his ability to perform mechanical tasks remotely is limited. For such tasks, divers are required. The French diving company, COMEX, set an open ocean, deep-diving record in October 1977 in the Mediterranean Sea off the south of France. COMEX and French Navy divers were saturated and lowered in a chamber to a depth of 430 m where they made a total of 10 hours of working dives during which a 9-inch pipeline connection was made. Two divers, one from COMEX and one from the French Navy, made two 10 - minute bounce dives to a record depth of 501 m. Decompression time from 430 m to the end of saturation was just over 7 days and 17 hours.

The hyperbaric facility at Duke University in North Carolina under the direction of Dr. Peter Bennett recently set a world depth record for chamber dives. Divers were pressured up to a similated depth of 686 m in February 1981, remained at that depth for 24 hours, and were safely returned to surface pressure.

Transportation

When production from deepwater completions is realized, a means of transporting to shore must be provided. Two choices are available: hydrocarbons may be piped to the surface and transported by tankers to land-based facilities or they may be transmitted by pipelines all the way.

ETPM has developed a method for laying pipe up to 42-in diameter in 1,000 m of water. This method is called RAT for Remorquage (towing), Aboutage (connecting), and Tension. Strings of pipe up to 1,000 m long are assembled on shore and fitted with buoyancy tanks. The strings are

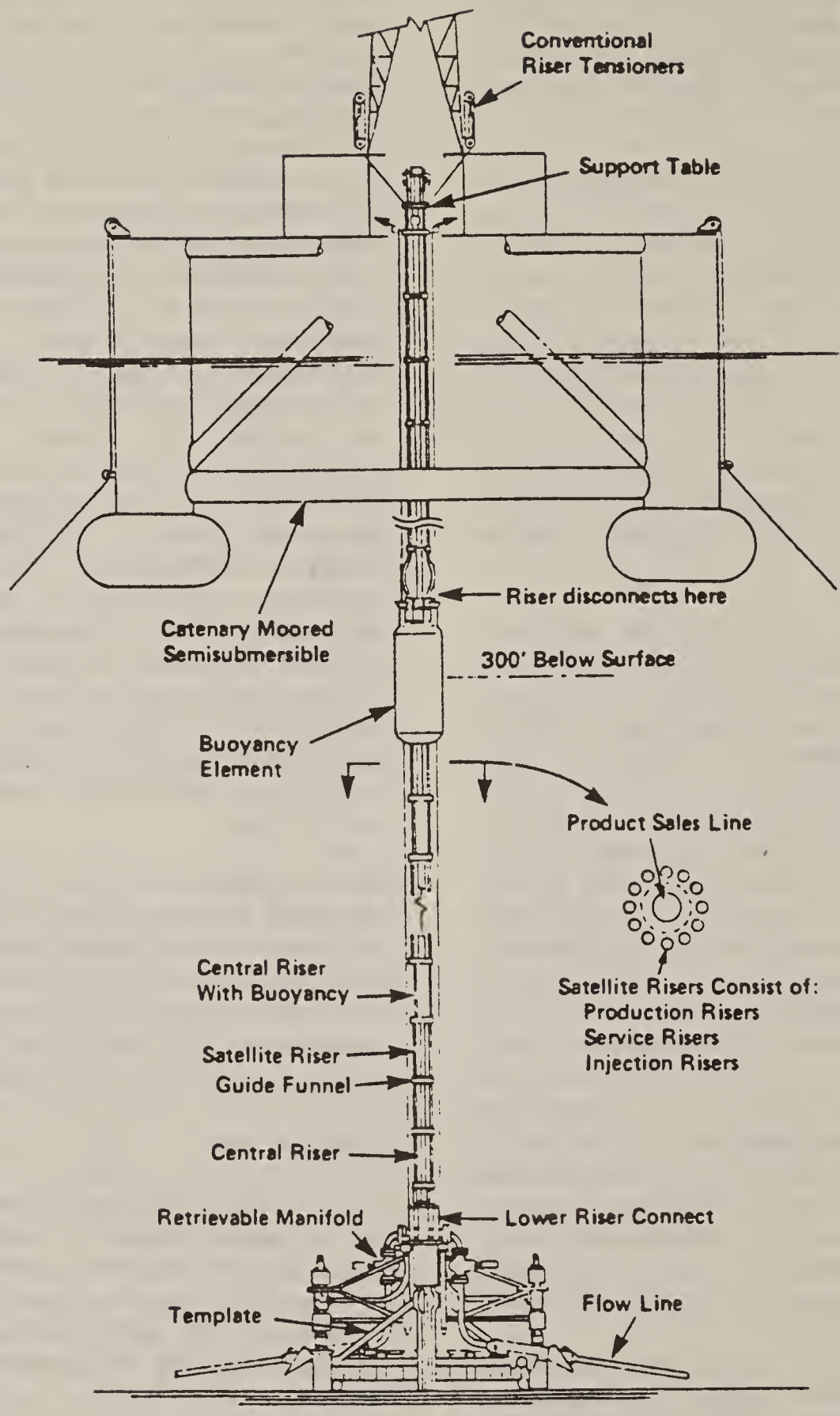


Figure 11. Free-Standing Riser

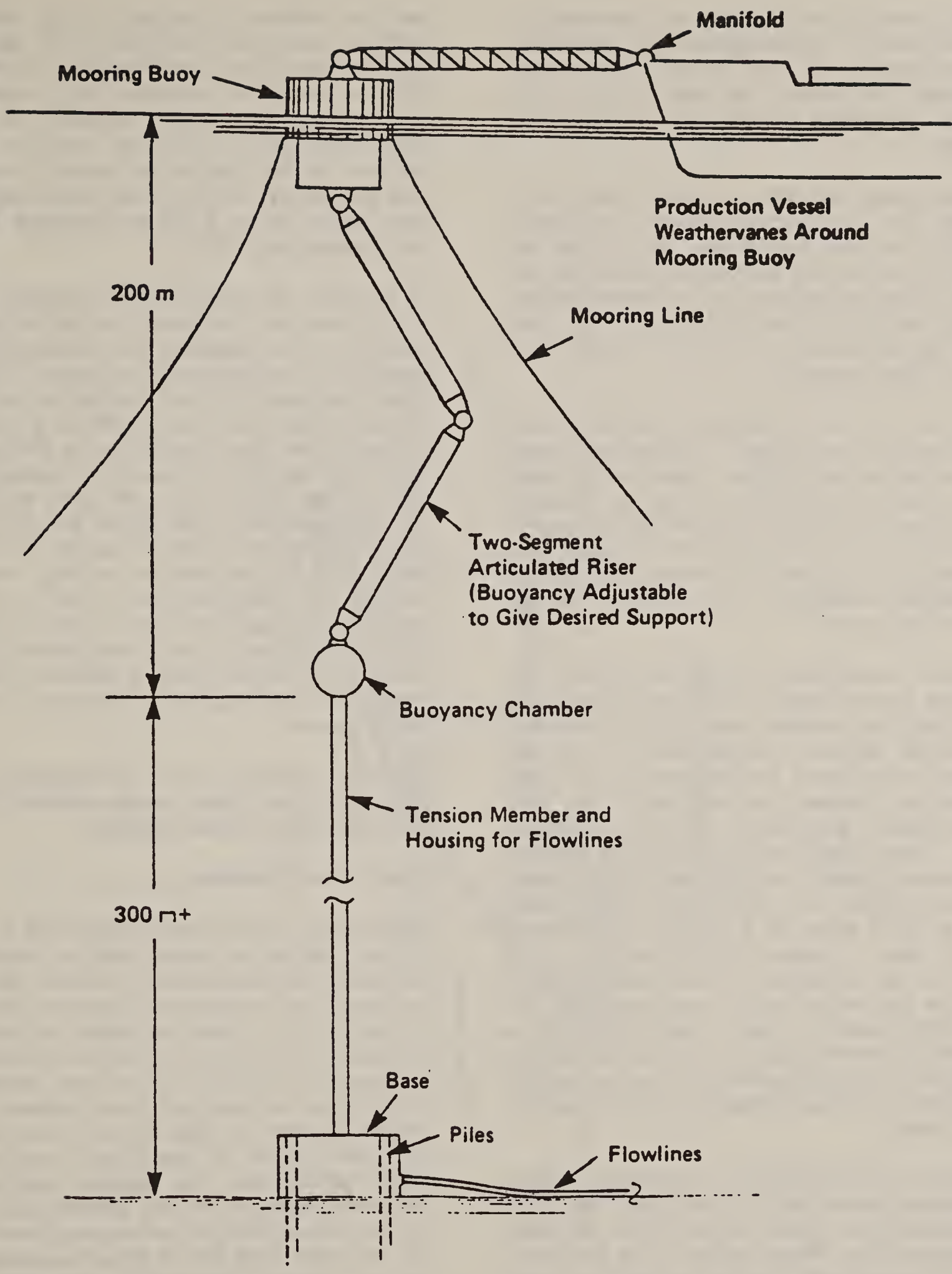


Figure 12. Exxon Articulated Riser

then towed to the laying site and connected by passing over a special dynamically positioned lay barge; they are then laid in a conventional manner. The method has been tested in the North Sea laying 42-inch pipe in 250 m of water.

Several other methods are used in deep water which are quite similar—surface tow, below surface tow, and bottom tow. In each case the pipeline is made up onshore and towed to the site, where it is connected by a conventional lay barge. Sections of pipe from 5 to 10 km long can be assembled and towed to the site using one of these methods.

All the methods discussed so far have used conventional technology. Conventional pipelaying technology utilizes tensioners to maintain tension on the pipe to keep the sag-bend radius and over-bend radius within acceptable limits (to keep the pipe from buckling) (see Figure 13). The limiting factor in conventional pipelaying techniques is the capacity of the tensioning system.

Another method of laying pipe which has proved very successful is the reel method. This method is less weather dependent than the conventional method and has been in use for many years. Santa Fe Engineering and Construction Company has constructed the first dynamically positioned reel-type pipelaying ship, "APACHE." The pipe is welded together on shore, spooled onto a large reel, and rolled off at the site. The "APACHE" is able to hold up to 50.5 miles of 4-in pipe, 5.7 miles of 16-in pipe, or various sizes in between. It is able to lay 16-in pipe in water depths around 610 m and smaller lines in water depths of 915 m. With smaller portable reels, it can lay a bundle of several pipes at one time. Using this method, a 12-inch pipeline has been successfully installed in the Gulf of Mexico in more than 300 m of water.

Saipem's 'CASTORO SEI" is a semi-submersible pipelaying barge which recently laid two 20-in pipelines from Tunisia to Sicily across the Mediterranean Sea. Water depths of up to 600 m were encountered. The production rate averaged 1.5 km per day and went as high as 2.5 km per day. The "CASTORO SEI" was able to continue work in seas up to 6 m, and the limiting factor for the vessel to continue operating was the weather limitations of the anchor handling tugs. The "CASTORO SEI" is currently laying another line along the same route. With this experience under their belt, Saipem is now testing the depth capability of the "CASTORO SEI" at 1200 m, and even this may not be the limit of the system. Officials with Saipem feel that the vessel can lay pipe in water depths up to 2,100 m (Petroleum Engineer International, 1980).

To alleviate the sag-bend and over-bend problems mentioned previously, an inclined ramp concept has been designed. This would partially eliminate the upper part of the "S-curve." Once again, tensioners are the limiting factor. To completely eliminate the over-bend, a method ("J-bend") has been devised to lay pipe vertically (see Figure 14). Conventional drilling rigs could be used to lower the pipe to the seafloor. The disadvantages of this system are that only one section of pipe could be welded at a time rather than the multistation welding used in conventional pipelaying and some sort of vertical tensioning device, such as those used in drilling, would have to be devised instead of the conventional friction pads. Research is underway on butt-welding pipe to help speed up the J-bend process.

Planning is underway for a 30-in pipeline from Algeria to Spain. Water depths approach 2,000 m and the vessel has been designed.

Summary and Conclusion

The industry presently has the capability to drill in water depths to about 2,440 m. Research is currently being conducted by several major oil companies and projections from such research are that within 5 years, technology will permit drilling in water depths to 3,000 m. The deepest exploratory well for oil or gas was drilled in 1,486 meters of water off Newfoundland. The deepest discovery to date is in 671 m of water off Spain but was of insufficient quantity to justify development. The deepest commercial wellhead completion is a dry completion in 189 m. The deepest wet tree subsea completion is in 146 m in the North Sea. A general consensus in the oil industry, however, is that they can presently produce in up to 900 m of water and that within 10 years, they will have the technology to produce in over 1,800 m of water.

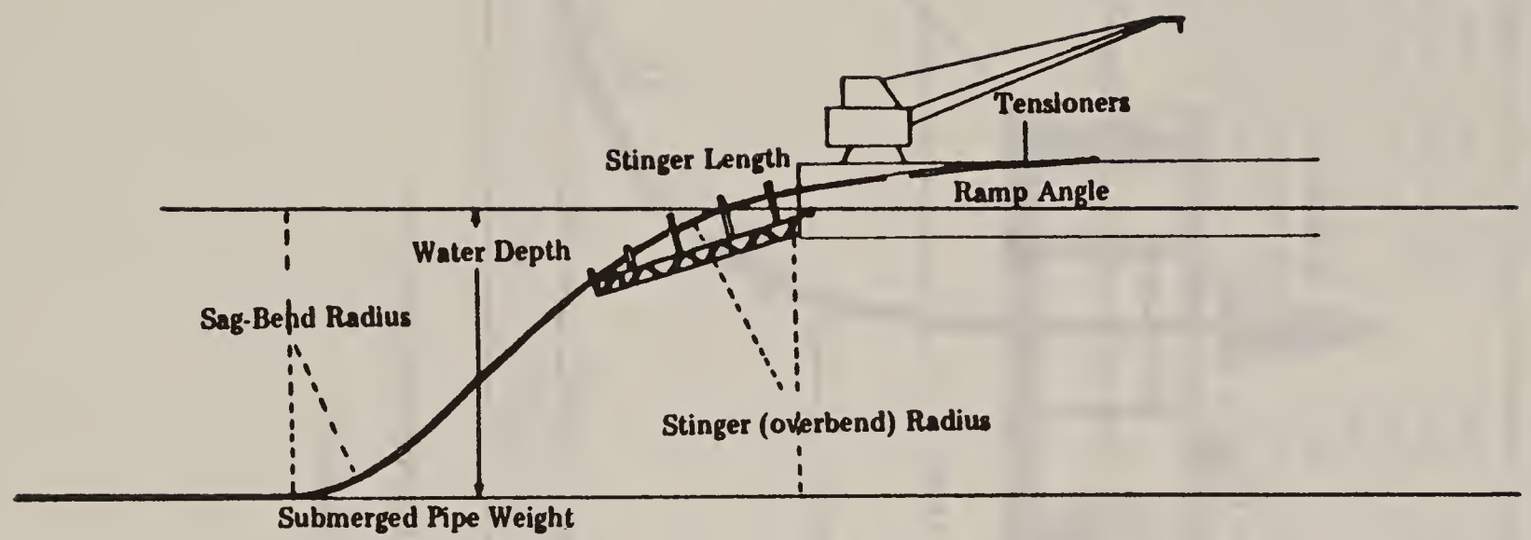


Figure 13. Conventional Pipelaying

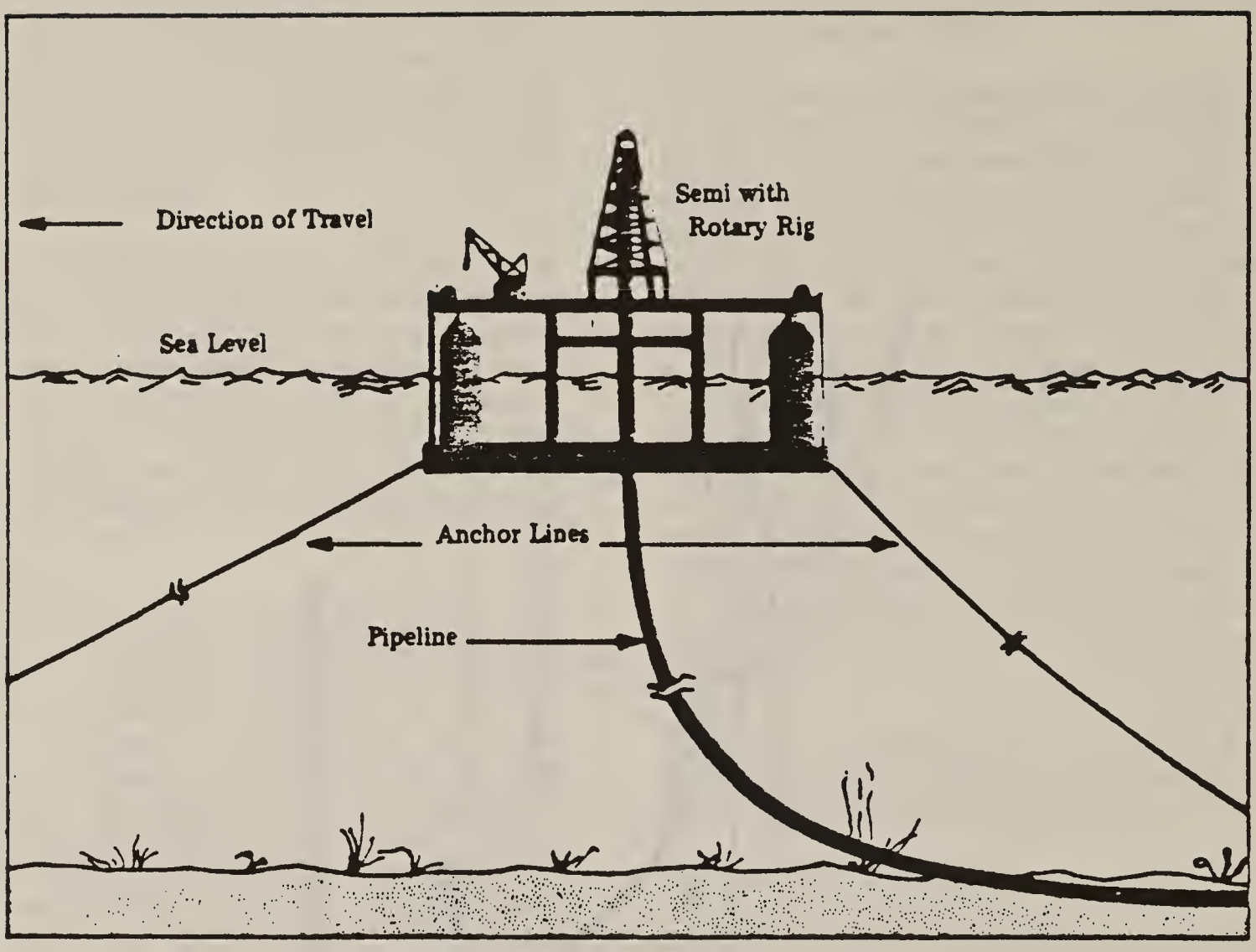


Figure 14. Vertically-laid Pipeline in Deep Water

Source: OFFSHORE Magazine

The deepest pipeline laid to date is the trans-Mediterranean 20-inch line in 600 m of water and there are plans for a line from Algeria to Spain in some 2,000 m of water.

Oil and gas operations in ever greater water depths require the use of new and more economical production systems. Subsea completion technology is being tested in shallow depths to provide procedures to be used in very deep water. All industry experts agree that if given the necessary economic incentives, the technology will be avialable. A secondary result of subsea completion technology is the ability to develop small reservoirs without the expenditures required for a surface structure. As the price of oil increases on the world market, the feasibility to utilize more sophisticated production systems will be realized.

The capability for deepwater drilling has been in existence for several years and, in fact, a surplus of that capability is expected to continue for several more years. The deep wells drilled in the next several years will probably be drilled by a dozen major oil companies in order to meet lease or concession obligations. Production riser technology is the limiting factor in the ability to exploit reserves of hydrocarbons occurring in deepwater. Before that exploitation can take place, the price of oil will have to increase significantly in order to make it economically feasible. Further incentives would be to offer larger tracts for lease (in U.S. waters) and to offer lease term extensions beyond the standard 5 years to allow additional time for development of technology for the particular site.

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APPENDIX 5

Trends in Other Energy Sources and Their Relation to the 5-Year Oil and Gas Lease Sale Schedule

To delay or eliminate, in part or in whole, the proposed 5-year OCS oil and gas lease sale schedule would reduce future OCS oil and gas production, necessitate escalated imports of oil and gas, and/or require the development of alternate energy sources to replace the energy resources expected to be recovered if the proposed sale takes place.

The oil and gas that would become available as a result of the proposal would add significantly to the national domestic production. If this proposal is cancelled, an additive impact of greater oil and gas deficits resulting in increased imports can be expected.

It is anticipated that the oil and gas that would become available from this proposal could provide significant contribution to this country's energy supply. If the subject proposal were cancelled, the following energy actions or sources might be used as substitutes; however, some of these actions are not feasible at this time and may not be during the next five years:

-Energy conservation
-Conventional oil and gas supplies
-Coal
-Nuclear power - fission
-Nuclear power - fusion
-Oil shale
-Tar sands
-Hydroelectric power
-Solar energy
-Energy imports
    Oil imports
    Natural gas pipeline imports
    Liquefied natural gas imports
-Geothermal energy
-Other energy sources
-Combination of alternatives

-Combination of alternatives

This section briefly discusses these alternatives. For more detailed information on each of these energy sources and environmental impacts, refer to Energy Alternatives: A Comparative Analysis (University of Oklahoma, 1975), prepared for the Bureau of Land Management by the Science and Public Policy Program of the University of Oklahoma.

Energy Conservation: Vigorous energy conservation is an alternative that warrants serious consideration. Several studies have suggested that we could enjoy the same standard of living and yet use 30 to 50 percent less energy than we do now (Lansberg et al., 1979). Aside from these savings, it is now widely recognized that wasteful consumption habits impose social costs that can no longer be afforded, as do pollution and an inequitable distribution of fuel. Existing conservation programs include education, research and development, regulation, and subsidies.

The residential and commercial sectors of the economy are often characterized as inefficient energy consumers. Inadequate insulation, inefficient heating and cooling systems, poorly designed appliances, and excessive lighting are often noticed in these sectors. Reductions in consumption beyond those in-

duced by fuel price increases could be achieved by new standards on products and building and/or subsidies and incentives. Such incentives include standards for improved thermal efficiency in existing homes and offices and minimum thermal standards for new homes and offices.

Excessive consumption is also evident in the industrial sector where energy inefficient work schedules, poorly maintained equipment, use of equipment with extremely low heat transfer efficiencies, and failure to recycle heat and waste materials are all commonplace.

Transportation of people and goods accounts for approximately 25 percent of nationwide energy use. Energy inefficiency in the transportation sector varies directly with automobile usage. Automobiles, which account for the bulk of all passenger movement in the nation, use more than twice as much energy per passenger mile as buses. Using short- and mid-term conservation measures such as consumer education, lower speed limits, and rate and service improvements on public transit and rail freight transit may achieve considerable energy savings.

Other policies which could encourage fuel conservation in transportation include standards for more efficient new automobiles and incentives to reduce miles traveled. An important new development in the fuel economy area could be the modification of the standard internal combustion engine. Although such an engine is now in the advanced stages of development, further study by automotive engineers, industry, and concerned Federal agencies is necessary before an acceptable engine may be designed.

Significant energy savings are clearly possible through accelerated conservation efforts. In addition, several of the strategies mentioned above have been at least partially implemented by the Energy Policy and Conservation Act of 1975 (P.L. 94-163).

Environmental Impact: The environmental impacts of a vigorous energy conservation program will be primarily beneficial. The exact nature and magnitude of these impacts will depend on whether there is a net reduction in energy use or whether the reduction is accomplished through technological change and substitutions. For the former, the net impacts will simply be that there are fewer pollutants of all kinds unleashed. As an example, a 2.2 million barrel/day savings would result in a diminishment nationwide of various pollutants by the following amounts (HUD Contract #H2026R: "Research Evaluation of a System of Natural Air Conditioning").

CO--4 lbs/1,000 gals = 189 tons/day
Hydrocarbons--3 lbs/1,000 gals = 142 tons/day
Particulates--23 lbs/1,000 gals = 1,088 tons/day
NOx--60 lbs/1,000 gals = 2,838 tons/day
SO2--157 lbs/1,000 gals = 7,426 tons/day

However, if energy conservation is achieved by technological change or substitution, the net reductions will be those above. Other impacts will be related or attributed to an OCS lease sale in another unidentified area or as described below.

Conventional Oil and Gas Supplies: Large quantities of oil and gas still remain in the United States. Between 1955 and 1969, the U.S. had slightly increasing amounts of proved oil reserves at about 30 billion barrels. The discovery at Prudhoe Bay in 1970 raised the amount to 40 billion, which has been declining ever since. Since 1970 new oil discoveries have replaced less than half of production. Reserves are currently at the lowest level since 1951. U.S. production has been fairly constant since the mid-60's at 8 to 9 million barrels daily. Similar patterns occur for natural gas. Proved reserves are currently estimated at 31.4 billion barrels of oil and 208.0 trillion cubic feet of natural gas.

Ultimately recoverable resources (all deposits known or believed to exist in such forms that economic extraction is currently or potentially feasible), in addition to proved reserves, are estimated to be about 82.6 billion barrels of oil (54.6 onshore/28.0 offshore), 13 years of consumption at current rates, and 593.9 trillion cubic feet of natural gas (426.9 onshore/167.0 offshore). This estimate is rising over time, mainly because of higher prices, and much is unexplored. Unconventional hydrocarbons and recovery methods, especially enhanced recovery, could more than double these figures. The amount of ultimately recoverable reserves will depend on price, technology, geological information, and public policy such as price controls, access to Federal lands, and environmental standards.

Petroleum production is severely constrained in the short-run, and greatly affected by world prices in the long-run. Although the long-run demand for fuel liquids is not forecast to decline significantly (feasible solid and gaseous substitutes do not appear to exist), consumption of conventional crude oil is expected to decline significantly, as synthetic liquids are produced from shale, tar sands, coal, and biomass, and industry and utilities retire oil facilities and shift to coal and nuclear (see Table 5). Synthetic liquid from coal is expected to be the major source of liquid fuel by 2020, supplying 50 percent of all liquid fuel and 10 percent of all energy consumed.

The following table displays the dimensions of the projected decline in conventional crude oil demand (see Table 5):

	1980	2020
Quads of Conventional Crude Oil Consumed	34	8
As Percentage of Total Energy Consumption	45%	6%
Quads of Liquid Fuel Consumed	34	30
As Percentage of Total Energy Consumed	45%	21%

Conventional natural gas consumption is expected to decline due to depletion, higher prices, and competition with synthetic gas from coal. Enhanced gas recovery from unconventional sources such as tight sands and Devonian shale is expected to make a significant contribution to gaseous fuel production, providing 50 percent of all gaseous fuel and 5 percent of all energy consumption

by 2020. Ultimately recoverable reserves from such sources are estimated at 3,000 trillion cubic feet. The following table displays the dimensions of the projected decline in gaseous fuel demand (see Table 5):

	1980	2020
Quads of Conventional Natural Gas Consumed	20	6
As Percentage of Total Energy Consumption	26%	4%
Quads of Gaseous Fuel Consumed	20	15
As Percentage of Total Energy Consumption	26%	11%

A detailed description of the crude oil and natural gas systems is found in Chapters 3 and 4 of Energy Alternatives: A Comparative Analysis.

Environmental Impact: This would entail environmental impacts such as land subsidence, soil sterilization, and disruption of existing land use patterns. Equipment failure, human error, and blowouts may also impair environmental quality. Moreover, poor well construction, particularly in older wells, and oilspills can result in ground and surface water pollution.

The water pollutants from onshore oil production are oil and dissolved solids. The amounts of each vary over a wide range. A summary of this is available in Energy Alternative: A Comparative Analysis.

Air pollutants (particulates, NOx, hydrocarbons, and CO) result from blowouts and subsequent evaporation and burning. These are generally insignificant, except locally. These effects will be basically the same, whether the production is onshore or offshore.

Given the fact that onshore supplies are dwindling, users of hydrocarbons from this proposal would have to continue their reliance on other regions and foreign imports for needed oil and gas. The decline in these supplies, even with energy conservation, could mean industrial shutdowns, increased unemployment, higher consumer prices, and changes in the standard of living. The lack of natural gas will mean additional use of "dirtier" alternative fuels (oil, coal) with consequent impacts on air quality and human health.

Coal: Coal is the most abundant energy resource in the United States. Proved domestic reserves of coal are estimated at 438 billion short tons. This constitutes over one-quarter of known world supply, 80 percent of U.S. proven fuel reserves, and 130 times the energy consumed in 1980. Ultimately recover-

able reserves are estimated at 3,900 billion short tons. A detailed discussion of the coal resource system can be found in Chapter 1 of Energy Alternatives: A Comparative Analysis.

Coal production (18.88 quads), consumption (15.67 quads), and inventories (203.6 million short tons) were at record levels in 1980, mostly as a result of increased demand from the electric utilities, including the conversion of existing power generating units from oil to coal. The 7 percent increase in coal production over 1979 is the main reason for the U.S.'s record energy production in 1980.

Though domestic coal reserves could easily replace the energy expected to be realized from the proposal, serious limitations to coal development exist. In many uses, coal is an imperfect substitute for oil or natural gas. In many other cases, coal use and production is restricted by government constraints, limited availability of low sulfur deposits, inadequate mining, conversion and pollution abatement technology, and the hazardous environmental impacts associated with coal extraction and electricity generated from coal. Coal production is also threatened by the unique set of labor problems associated with mining and new, strict standards for coal-mine safety.

Due to its relative price advantage over other fuels, competitive market structure, and large resource base, coal consumption and production are expected to increase significantly and become the primary domestic energy source (see Table 5). Synfuels from coal will also be important (see below).

The Powerplant and Industrial Fuel Use Act of 1978 was designed to reduce petroleum and natural gas consumption and to encourage greater use of coal and alternative fuels. The Act prohibits all new electric powerplants and large industrial boilers, and existing ones after 1990, from consuming oil or natural gas as a primary fuel source unless an exemption is granted.

Although U.S. coal resources are very large, as with other extractable mineral fuels, there is some geographic dislocation. Most of our new low sulfur coal is found west of the Mississippi River or in Alaska, far from industrial areas. Also, much of the western coal is in arid or semi-arid areas where scarcity of water could constrain development.

If an alternative to the proposal is greater reliance on coal, it may be expected that mining would increase in western states to provide the necessary fuel source.

Environmental Impact:

Coal Utilization: Combustion of coal results in various emissions, notably SO_2 and particulates. If the expected production from this proposal is replaced by coal, there will be an increase in these pollutants, especially if coal is substituted for the natural gas presently used. Technology to control these emissions is available, but has not yet been proven sufficient to be widely applied. The sulfur content of eastern coal varies considerably, but approximately 65 percent of the developed resources have a sulfur content exceeding 1 percent. Most of the U.S. low sulfur coal is located in the western states. Any large-scale shift to coal would require relaxation of emission regulations or improvement of technologies to convert coal to gaseous or liquid fuels.

Surface Mining: The primary impact of surface mining is disruption of the land. This affects all local flora and fauna and water quality, and it increases landscape problems due to erosion and runoff from the mine. Reclamation is difficult in the western states due to the lack of water to assist in revegetation. Other problems include acid mine water drainage, leachings from spoil piles, processing waste, and the disturbance caused by access and transportation. Noise and vibration resulting from operations can also be expected. Finally, surface mining causes conflicts with other resource uses such as agriculture, recreation, water, and wildlife habitat.

The land use of strip-mining ranges from 0.8 to 5.9 acres/10^{12} BTU extracted, depending on seam thickness and BTU content of the coal.

Underground Mining: Underground mining primarily affects land and water quality. The land impacts are those that arise from subsidence, waste disposal, access, and transportation. Very little surface is disturbed. Subsidence can destroy structures, cause landslides and earthquakes, and disrupt groundwater circulation patterns. The amount of subsidence can be controlled by the mining method used and the amount of coal removed. Both have detrimental effects on the economics of the operation.

Water quality is affected by both processing waste and the drainage of acid mine-water into surrounding areas. These can be minimized through the proper methods of control both during and after operations. Entrances can be sealed and waste piles can be replaced in the mine. This would also help minimize subsidence. There are also pollution problems associated with road and coal dust and the like, but these are minimal and easily controlled. Other disturbing aspects of mining have much less of an impact in an underground mine. Working conditions of underground mines have been improved under the Federal Coal Mining Health and Safety Act of 1969, although further efforts are needed to reduce health hazards. This program has resulted in increasing costs of underground mining relative to surface mining, which has even more severe environmental restraints and impacts.

Coal Transportation: The five major transportation systems (road, rail, water, conveyer, and pipeline) all have some adverse environmental impacts. These include air and noise pollution, safety, land use, trash disposal, and aesthetics. However, since spill problems are not associated with coal, most of the impacts can be controlled with greater care and consideration. A slurry pipeline also requires large supplies of water and must adequately dispose of this at the other end. Water availability is a problem in many areas of the U.S., especially in the west where energy resource requirements will have to compete with other existing commercial and private users for a limited and fragile supply.

Coal Conversion: Technology for conversion of coal into gaseous and liquid hydrocarbons has been established for several decades, and a number of relatively low-capacity commercial plants exist in various parts of the world. However, few cost-effective advanced technologies have progressed beyond the pilot plant stage.

Numerous problems remain before commercial development of synthetic fuels from coal can proceed. Specific technical problems must be solved. The cost effectiveness of synthetic fuels from coal will depend on prices of other fuels, primarily oil and natural gas.

The Energy Security Act of 1980 created the United States Synthetic Fuel Corporation. The corporation is empowered to provide financial assistance to the private sector for commercial synthetic fuel projects. The goal of the corporation is to increase sythetic fuel production to the equivalent of at least one-half million barrels of oil per day by 1987 and two million barrels per day by 1992.

Control of adverse environmental effects will increase the cost of producing synthetic fuels. Possible constraints on development include technological constraints, availability of skilled workers, raw materials (coal, water, steel), capital, institutional constraints government policies (energy resource leasing, coal mining regulations, permit procedures, etc.) and the willingness of industry to invest in development of new technologies.

Synthetic oil and gas could contribute substantially to energy supplies by the year 2000. The most important contributors would be high-BTU gas from coal, synthetic crude oil from oil shales, and coal liquefaction. The success of these energy sources will depend on developing technology, the cost of the impacts, and the cost of conventional oil and gas.

Coal Gasification: Gaseous fuels with low, intermediate, or high energy content can be produced. Low and intermediate gases are produced in a 2-stage process involving preparation and gasification, and the output is utilized as feedstock for electric generators. A third process, upgrading, is required to produce high-BTU gas, which produces an end product usable by the consumer.

Among low-BTU gasification processes under development are: Lurgi, Koppers-Totzek (both in commercial use), Bureau of Mines Stirred Fixed Bed, and Westinghouse Fluidized Bed. Among high-BTU gasification processes are: Lurgi High-BTU gasification process, HYGAS, BI-Gas, Synthane, and CO2 Acceptor.

The environmental impacts of coal gasification are those of mining plus those resulting from the production processing. Gasification processes have lower primary efficiency than direct coal combustion; more coal will have to be gasified to reach an equivalent BTU output. However, it is likely that coal gasification will achieve primary efficiencies of 70 percent which is about twice that of coal to electricity end use. Water impacts of processing can be minimized by recycling and evaporation. However, large inputs of water are required for some of the technologies, thus creating the potential for conflicts in water-short areas. For example, a Koppers-Totzek gasifier producing 250×10^9 BTU per day will require water in the amount of 463,000 gallons per day and coal in the amount of 10,570 tons per day.

Air pollution could include sulfur dioxide, particulates, nitrous oxides, hydrocarbons, and carbon monoxides.

Land impacts result from solid waste disposal plus land use for the plant, coal storage, cooling sands, etc. Solid wastes include ash, sulfur, and minute quantities of some radioactive isotopes.

Coal Liquefaction: Liquified coal is expected to replace conventional crude oil as the major source of liquid fuel and provide 10 percent of total domestic energy consumption by 2020 (see Table 5).

As with coal gasification, production of liquid fuels from coal requires either addition of hydrogen or removal of carbon from the compounds in the coal. Coal liquefaction can be accomplished by hydrogenation, pyrolysis, or catalytic conversion. Only catalytic conversion is in commercial operation. Among liquefaction processes under development are: synthoil, H-Coal, Solvent Refined Coal, Consol Synthetic Fuel, COED, TOSCOAL, and Fischer-Tropsch.

Again, the impacts of liquefaction will be those of mining and those of the processing plants. The available technologies have a recovery of from 0.5 to 3 barrels of oil per ton of coal processed.

Water effluents from liquefaction plants could contain amounts of phenols, solids, oil, ammonia, phosphates, etc. The waste water could be treated to remove most of these products.

Air pollution could result from particulates, nitrogen, sulfur oxides, and other gases. Pollution control facilities would be required but would lower the economic attractiveness of the plants.

Solid wastes would be mostly ash. Residue could be buried in the mine with little further environmental impact, if liquefaction plants are sited at the opening of the mine.

Nuclear Power-Fission: The predominant nuclear system used in the United States is the uranium dioxide fueled, light water moderated and cooled nuclear power plant. Research and development is being directed toward other types of reactors, notably the breeder reactor and fusion reactors.

Between 1970 and 1980 nuclear energy production increased from 21.8 billion kilowatt hours (1.4% of total U.S. electricity production and 0.4% of total energy production) to 251.1 billion kilowatt hours (11.0% of total U.S. electricity production and 4.2% of total energy production). Installed generating capacity increased from 6.5 million kilowatts (1.9% of U.S. total) to 56.5 million kilowatts (9.2% of U.S. total).

Due to environmental concerns the growth of nuclear energy may be slowing. At the end of 1980 there were 75 reactors in the U.S., up from 19 in 1970. Although four reactors were licensed in 1980, fourteen other planned units were cancelled, and the Nuclear Regulatory Commission closed five for modification to comply with revised seismic requirements, and shut down eight reactors comparable to Three Mile Island's to determine the probability of a similar accident and make required safety modifications. Nuclear-energy output was down 1.6 percent in 1980. There are currently 102 reactors under various stages of construction, construction permit review, or on order.

Nuclear power development has encountered delays in licensing, siting, and environmental constraints as well as manufacturing and technical problems. Future capacity will be influenced by the availability of plant sites, plant licensing considerations, environmental factors, nuclear fuel costs, rate of development of the breeder and fusion reactors, and capital costs.

Domestic uranium resources are probably plentiful. Ultimately recoverable reserves are estimated to be 6,876 million short tons, and large areas are unexplored. Twenty-one million short tons were consumed in 1980 domestic nuclear energy production.

Although fuel cycle costs of nuclear reactors have increased only slightly in recent years, present trends in reactor capital costs are significantly narrowing the economic advantage offered by fuel-cycle costs over coal- and oil-fired plants. Nuclear energy may provide up to 19 quads in 2020, 13 percent of total domestic consumption (see Table 5).

Environmental Impact: Although nuclear plants do not emit particulates or gaseous pollutants from combustion, the potential for serious environmental problems exists. Some airborne and liquid radioactive materials are released to the environment during normal operation. The amounts released are very small, and potential exposure has been shown to be less than the average level of natural radiation exposure. The plants are designed and operated in such a way that the probability of harmful radioactivity released from accidents is very low.

Nuclear plants use essentially the same cooling process as fossil-fuel plants and thus share the problem of heat dissipation from cooling water. However, light water reactors require larger amounts of cooling water and discharge greater amounts of waste heat to the water than comparably sized fossil-fuel plants. The effects of thermal discharges may be beneficial in some though not all cases. Adverse effects can often be mitigated by use of cooling ponds or cooling towers.

Low-level radioactive wastes from normal operation of a nuclear plant must be collected, placed in protective containers, and shipped to a Federally-licensed storage site for burial. High-level wastes created within the fuel elements remain there until the fuel elements are processed. Currently, spent fuel is stored at NRC-licensed facilities. Plans call for recovering unused fuels at reprocessing plants, solidifying the wastes, and placing them in storage at a Federal Repository.

Primary residuals from light water reactors are waste heat and radioactive emissions. For a 1,000 MW(e) plant operating at a 75-percent load factor, a 33-percent-efficient nuclear plant would emit 47×10^{12} BTU's of waste heat annually. For comparison, a 40-percent-efficient fossil-fuel plant would emit 36×10^{12} BTU's of waste heat.

There are also impacts on land, water, and air quality arising from the mining of these uranium ores. Dwindling amounts of high grade reserves will increase the amounts of land mined for lower grade radioactive ores--primarily in western states. The mining operations will be similar to coal, but the nature and distribution of the deposits mean "lesser" impact while radioactive tailings cause unusual problems for disposal, the environment, and human health.

A more complete discussion of uranium mining and processing, the economics and environmental impacts, as well as nuclear fission and fusion can be found in Chapters 6 and 7 of Energy Alternatives: A Comparative Analysis.

Nuclear Power-Fusion: The controlled fusing of atoms in a reactor is a long-term alternative energy source. Scientific feasibility has yet to be proven but looks promising. Technological and commercial feasibility will have to follow, however. The main obstacles are obtaining a high enough temperature and containing the reaction. It is unlikely that fusion will be available to any significant degree before 2025.

Fusion is attractive for two reasons: abundant fuel sources and relative safety. The reaction is fueled by deuterium and tritium. Deuterium exists naturally in sea water and would be nearly cost-free. Tritium can be inexpensively produced in a reactor from lithium, which is plentiful.

Because of the small neutron activation involved in fusion reactions there would be lower radioactive inventories, fewer radioactive wastes, less serious fuel-handling problems, and differences in accident risk.

A proposed hybrid fusion-fission fuel cycle would fuel fission reactors with fusion-produced isotopes and multiply the energy release of fusion tenfold while demanding less of the fusion core, thus enhancing the safety characteristics of both reactors.

A proposed pure deuterium process, while possessing a lower reaction rate, would have a neutronless fuel cycle. Thus all particles and products would be electrically charged and there would, in theory, be no radioactivity.

Environmental Impact: The environmental risks from fusion energy are probably less than fission, but the degree of reduction, and the social acceptability of that degree, cannot be determined presently.

Oil Shale: Oil shale is a fine-grained, sedimentary rock which, when heated, releases a heavy oil that can be upgraded to synthetic crude oil. The technology for exploitation currently exists and commercial production may begin by 1984. The resource base for shale is very large, perhaps as much as 360 billion barrels.

Large areas of the United States are known to contain oil shale deposits, but those in the Green River Formation in Colorado, Wyoming, and Utah have the greatest commercial potential.

Classes one and two deposits are at least 30 feet thick, average 30 gallons of oil per ton of shale, and include only the most accessible and better defined deposits. Class three deposits are as rich as classes one and two, but more poorly defined and less favorably located. Class four deposits are lower grade, poorly defined deposits ranging down to 15 gallons of oil per ton of shale.

Environmental Impact: Oil shale development poses serious environmental problems. With surface or conventional underground mining, it is very difficult to dispose of the huge quantities of spent shale, which occupy a larger volume than before the oil was extracted. Inducing revegetation in an area of oil shale development is difficult and may take more than 10 years. In-place processing avoids many of these environmental hazards. The spent shale problem is much less severe with underground mining.

Air pollutants from the mining will come from dust and vehicular traffic. These will be predominantly particulates, followed by NO_x and CO, with minimal amounts of hydrocarbons, SO_x and aldehydes.

The mining of oil shale requires little water, both for operations and for reclaiming solid wastes. Water pollutants are considered negligible but may arise if saline water was encountered during the operations and had to be disposed of.

However, the processing (retorting) operations consume large quantities of water and generate large amounts of waste water. The waste water must be treated and can be reused in the process. Therefore, it has been assumed that water pollution will not be a problem outside the complex. However, the limited availability of input water in the development area could lead to resource use conflicts.

Air pollutants vary with the technology used. Solid waste comprises the greatest problem of oil shale processing. The volume of the waste is greater than the volume of the input. Therefore, backfilling and the like would not provide a sufficient disposal space. Finally, there are the impacts of access and of transporting the products. These are analogous to those of coal mining in the case of access, and petroleum distribution in the case of transporting the product.

A fuller description of this energy source can be found in Chapter 2 of Energy Alternatives: A Comparative Analysis.

Tar Sands: Tar sands are deposits of porous rock or sediments that contain hydrocarbon oils (tar) too viscous to be extracted by conventional petroleum recovery methods. Large-scale production efforts have been developed in Canada, but U.S. ventures have been minor. U.S. resources are concentrated in Utah, with some potentially commercial quantities in California, Kentucky, New Mexico, and Texas.

About 1.5 tons of rich tar sands yield about one barrel of tar, or bitumen, the equivilant of about 6.3×10^6 BTU's. Tar can be recovered either by surface or underground mining, or underground extraction of the oil without mining. Recovery is followed by processing, upgrading to synthetic crude, and refining.

Ultimately recoverable reserves may be 100 billion barrels, including other heavy oils.

Environmental Impact: Surface mining produces substantial residuals, including modification of surface topography, disposal of large amounts of overburden, dust and vehicle emmissions, and water pollution. Reclamation can minimize these impacts. Residuals are similar to those of coal.

The impacts of processing tar sands are similar to those of oil shale. These include solid tailings from extraction, cooling water and blowdown streams; thermal discharges, and off-gases. Under controlled conditions these residuals can be minimized.

Underground extraction without mining can result in thermal additions, contamination of aquifers, surface spills, surface earth movements, noise pollution, and emission of gases.

Hydroelectric Power: Hydropower is energy from falling water, which is used to drive turbines and thus produce electricity. Conventional hydroelectric developments convert the energy of natural regulated stream flows falling from a height to produce electric power. Pumped storage projects generate electric power by releasing water from an upper to a lower storage pool and then pumping the water back to the upper pool for repeated use. A pumped storage

project consumes more energy than it generates but converts offpeak, low-value energy to high-value peak energy. A more detailed discussion of this energy source is found in Chapter 9 of the Energy Alternatives: A Comparative Analysis.

Many of the major hydroelectric sites operating today were developed in the early 1950's. Thirty to forty years ago hydroelectric plants supplied as much as 30 percent of the electricity produced in the United States. Although hydroplant production has steadily increased, thermal-electric plant production has increased at a faster rate.

From 1970 to 1980 hydroelectric power production has fluctuated slightly between 220 and 300 billion kilowatt hours, about 4 percent of total U.S. energy production. As a proportion of total U.S. electricity production and installed generating capacity, hydroelectricity has dropped from 16 to 12 percent, although the latter has increased from 55.1 to 76.4 million kilowatts. Much of the recent hydroelectric development has been pumped storage capacity.

It is likely that hydroelectric power will continue to represent a declining percentage of the total U.S. energy mix due to the following: high capital costs, seasonal variations in waterflows, land use conflicts, environmental effects, water use, and flood control constraints. Sites with the greatest production capacity and lowest development costs have already been exploited.

Environmental Impact: Construction of a hydroelectric dam represents an irreversible commitment of the land resource beneath the dam and lake. Flooding reduces wildlife habitat and often prevents other uses such as agriculture, mining, and free-flowing river recreation.

Hydroelectric projects do not consume fuel and do not cause air pollution. However, use of streams for power may displace recreational and other uses. Water released from reservoirs during summer months may change ambient water temperatures and lower the oxygen content of the river downstream, adversely affecting indigenous fish. Fluctuating reservoir releases during peak load operation may also adversely affect fisheries and downstream recreation. Screens placed over turbines prevent the entrance of fish, but small organisms may pass through and may be killed.

Fish may die from nitrogen supersaturation, which results at a dam when excess water escapes from the draining reservoir. High nitrogen levels in the Columbia and Snake Rivers pose a threat to the salmon and steelhead resources of these rivers. Other adverse impacts to water quality include possible saline water intrusion into waterways and decreased ability of the waters to accommodate waste discharges.

Air quality will only be affected by dust and emissions during the construction phase. Afterwards, if the impoundment is used for recreation, motor exhaust would occur.

Solar Energy: Applications of solar energy must take into account the following:

Solar energy is a diffuse, low intensity source requiring large collection areas. Only a small portion of the potential energy is utilized.

Its intensity is continuously variable with time of day, weather, and season.

Its availability differs widely between geographic areas.

Potential applications of solar energy show a wide range. Among them are:

Thermal energy for buildings -
Water heating, space heating, space cooling, combined systems
Renewable clean fuel sources -
Combustion of organic matter
Bioconversion of organic materials to methane
Pyrolysis of organic materials to gas, liquid, and solid fuels
Chemical reduction of organic materials to oil
Electric power generation -
Thermal conversion
Photovoltaic - residential/commercial, ground central station, space central station
Wind energy conversion
Ocean thermal difference

Solar energy collection systems are now commercially available nationwide. Sales of collectors has risen from 1.2 million square feet in 1974 to 14.3 million square feet in 1979.

Environmental Impact: Although fuel costs for backup systems and maintenance costs for solar units are small when compared with operating costs of conventional heating and cooling systems, the high initial or "fixed" costs of solar units make them unattractive to many homeowners and builders. However, the rising cost of the gas and oil needed by the conventional heaters means that, over time, the greater fixed costs of solar systems will be balanced by their lack of fuel costs.

Large-scale generation of electricity using solar energy is another promising application which is receiving increased funding. A number of technical and engineering problems now prevent commercialization of solar steam-electric plants, though pilot projects are well under way.

Additional detail on this resource alternative is found in Chapter 11 of Energy Alternatives: A Comparative Analysis (U.S. Government Federal Policy Task Force Review Group, Solar Energy Analysis, 1978; Solar Energy Progress and Problems, 1978, EPA, U.S. DOE, and Lawrence Berkeley Laboratories, et al.).

Among the disadvantages of solar energy are high capital costs, expensive maintenance of solar collectors, thermal waste disposal, and distortion of local thermal balances.

The impacts so far identified with solar energy are relatively minimal. The primary effects of the use of this energy source on a wide scale will be land

use. Due to the low density of the energy, large areas will be necessary for the collectors. However, the land use compares favorably with other forms of energy use such as coal extraction.

The only other area for concern known so far is thermal pollution. Direct use in space heating has no thermal effects. However, for solar electric power generation, heat will have to be collected and transferred to the generator.

Some localized thermal pollution may occur as a result, but the problem is not expected to be significant. Finally, solar plants can only operate intermittently. Thus, the energy will have to be either stored, or backup fossil-fuel plants will have to be built. These will have their own sets of environmental constraints.

Oil Imports: Spurred by new discoveries and competition, Middle East oil production expanded in the 50's and 60's. New markets were opened and prices softened. The real price of oil fell from 1948 to 1972.

Simultaneously, U.S. consumption of oil increased while production stayed constant; imports were relied upon to make up the difference.

In 1973 the Arab-Israeli war was accompanied by an embargo imposed by OPEC against nations supporting Israel. The vulnerability of the importers to their own heavy demand became evident, and a huge price increase followed. This marked the end of the so-called era of "cheap energy" and efforts were made to curtail imports. Another large price increase occurred in 1979.

Three avenues were pursued for reducing imports: conservation, or reduced net energy demand per unit of output; alternative energy; and increased domestic production.

The results of these efforts for reducing imports seem to have been mostly successful. The underlying market structure for energy has been altered. World demand for oil peaked in 1977 and appears to be in an irreversible structural decline. Gross national products have been rising along with non-energy output, alternative energy sources, and non-OPEC production. Declines in energy use have been wholly oil.

OPEC produced 32 million barrels per day (mbd) in 1977 and now produces 24 million barrels daily. Current projections of energy consumption until the year 2000 show rates of half of what was projected in 1972. DOE is currently projecting a .9-percent annual growth rate (actual growth was 1.9% annually from 1970-1979), and a 3-percent annual economic growth. The dimensions of the structural change for the U.S. in 1981 are as follows:

-- total energy consumption is down 5 percent.

-- petroleum consumption is down (8 percent) for the third straight year.

-- oil consumption as a percentage of total energy consumption is down 9 percent.

-- imports of petroleum are down for the fourth straight year. Imports in May 1981 were 5.2 mbd, the lowest in 10 years. This is 20 percent less than in 1980 and 38 percent less than in 1979.

-- imported petroleum as a percentage of total petroleum consumption is down 5 percent.

-- imported petroleum as a percentage of total energy consumption is down 27 percent.

-- quads per dollar of GNP has been steadily declining since 1970.

OPEC will probably control the bulk of the world's oil production for the remainder of the century, and, due mainly to the short-term inelasticity of supply of substitutes, set prices based on factors besides price/cost relationships. Thus the less dependent the U.S. is on OPEC, the less vulnerable the U.S. is to large, erratic price increases. Imports from the Middle East also bring problems of stability of supply, balance of payments, currency exchange rates, and U.S. offloading capacity.

The U.S. will probably remain somewhat dependent on imported energy throughout this century, and as the 70's showed, there are situations in the Middle East which could lend to major disruptions in supply or huge price increases. However, the propensity for such anomalies is less than previously due primarily to the following:

-- As mentioned above the underlying market structure for energy has been altered and demand for oil has declined drastically. Associated with this, OPEC will have considerable spare capacity and price cohesiveness will be difficult to maintain.

-- All OPEC nations need to produce oil to finanace development. The goal of many OPEC nations is to maximize oil's long-term contribution to the national economy, rather than to maximize short-term profits. If revenue falls below a certain level where they are not getting an acceptable income, domestic tensions may ensue.

-- The OPEC economies, especially Saudi Arabia's, are more interdependent with the West than previously. OPEC has invested interest and financial reserves in the West, imports from the West, and has their oil prices tied to Western currency exchange rates.

-- The presence of strategic stockpiles provides both a deterrent to intentional disruptions in world markets and a cushion for smoothing price and supply shocks. Current stockpile inventories of most Western nations are at record levels.

OPEC's output and pricing structure will also depend on their balancing of:

--future vs. present proceeds.

--benefits vs. costs of rapid modernization.

--discipline in the market vs. the political unity of OPEC.

Environmental Impact: The primary hazard to the natural environment of increased oil imports is the possibility of oilspills, which can result from accidental discharge, intentional discharge, and tanker casualties. Intentional discharges would result largely from uncontrolled unballasting of tankers. The effects of chronic, low-level pollution are largely unknown. The worldwide tanker casualty analysis indicates that, overall, an insignificant amount of the total volume of transported oil is spilled due to tanker accidents. However, a single incident such as the breakup of the Torrey Canyon in 1967 or the Amoco Cadiz in 1978 can have disastrous results. Of more concern than tanker spills is the impact to the social and economic environment. The potential for a future embargo under this option is such that American productivity and policy could become subservient to foreign influence, having both national economic and security implications. On a more subtle level, political alignments and policies of the United States could become tied to those of foreign oil powers. This option is the least acceptable for continued American energy independence.

Natural Gas Imports: Imports of natural gas via pipeline have come largely from Canada with small amounts from Mexico. In 1980, net pipeline imports from Canada were 881 billion cubic feet, about 4.4 percent of total natural gas used in the United States. These imports were about 33 percent of Canada's natural gas production.

The natural gas import situation continues to be highly uncertain. A major reason for this uncertainty is the disparity between prices for natural gas and alternative fuels in this country and the price of crude oil in world markets.

The United States and Canada concluded an agreement in March 1980 that established a formula for escalating the price of Canadian imports. The formula prices Canadian gas at the BTU-equivalent price of Canadian crude oil imports, minus an adjustment that reflects savings to Canada of certain transportation costs. In response to escalated Canadian prices, demand in the U.S. for Canadian gas dropped sharply. Consequently, Canada has foregone the opportunity to raise its export price. What modifications, if any, the Canadians will make to their pricing formula, and what minimum amounts of Canadian gas Americans must take under existing contracts, are matters currently being examined on both sides of the border.

Mexico could be a significant source of future imports because of its relatively large natural gas resource base. Imports from Mexico were of a local nature until 1957 and have declined since 1969. In September 1979, an agreement also was concluded between the U.S. and Mexico regarding the importation and pricing of natural gas. A base price was specified to be escalated in proportion to the average price of five crude oils traded on the world market. However, the rapid increase in world oil prices between the time the agreement was concluded and the time the price escalation began brought the price of Mexican gas substantially below both oil parity and the Canadian gas price. Consequently, Mexico requested and received the same price as the Canadians.

Natural gas imports are expected to be eliminated in the long run, as domestic natural gas production will nearly satisfy decreasing demand, and synthetic gas from coal can provide the balance and replace imports.

Environmental Impact: The environmental impacts of increasing gas imports derive mainly from the possible increased use of land for pipeline construction. A further impact is the risk of explosions and fires. Fluctuations of that supply could influence quality of life, productivity, and employment. American policies could also become influenced by decisions of foreign gas producers, much as they could under the option of increasing oil imports.

Liquefied Natural Gas Imports: The growing shortage of domestic natural gas has encouraged projects to import liquefied natural gas (LNG) under long-term contract. Large scale shipping of LNG is a relatively new industry. Several LNG projects are now under consideration on the Pacific, Atlantic, and Gulf Coasts. Security of foreign LNG is questionable. The complexity of the length of time involved in implementing these proposals has been increased by the need for negotiating preliminary contracts, securing the approval of the Federal Power Commission and the exporting country, and making adequate provision for environmental and safety concerns in the proposed U.S. facilities. The costs of liquifying and transporting natural gas other than overland by pipe are high.

The U.S. imported 85 billion cubic feet of LNG from Algeria in 1978. In March 1980 Algeria announced it was demanding oil price parity free on board for gas it exports to the United States, and it subsequently discontinued deliveries. The free-on-board price does not include transportation, terminal, and regasification costs, which are substantial. Negotiations with Algerians are in progress.

Environmental Impact: The environmental impacts of LNG imports arise from tankers; terminal, transfer, and regasification facilities; and transportation of gas. The primary hazard of handling LNG is the possibility of a fire or explosion during transportation, transfer, or storage.

Receiving and regasification facilities will require prime shoreline locations and dredging of channels. Regasification of LNG will release few pollutants to the air or water.

LNG imports will influence the U.S. balance of payments. This impact will depend on the origin and purchase price of the LNG, the source of the capital, and the country (U.S. or foreign) in which equipment is purchased and LNG tankers are built.

Geothermal Energy: Geothermal energy is primarily heat energy from the interior of the earth. It may be generated by radioactive decay of elements such as uranium or thorium, and friction due to tidal or crustal plate motions.

There are 4 major types of geothermal systems: hot water, vapor dominated, geopressured reservoirs, and hot dry rock systems.

In addition to electricity, geothermal energy can offer a potential for space heating, industrial processing, and other nonelectric uses in many areas which presently are highly dependent upon oil and gas for energy needs. However, geothermal electric generating plants are smaller than conventional plants and require a greater amount of steam to generate the equal amount of energy. This is due to the fact that temperatures and pressures associated with geo-

thermal areas are lower than those created at conventional poser plants. In some areas, geothermal resources may have potential for space heating, industrial processing, and other nonelectric uses.

The greatest potential for geothermal energy in the U.S. is found in the Rocky Mountain and Pacific regions; some potential exists in the Gulf Coastal Plain of Texas and Louisiana. The geyser field in California is the most extensively developed source of geothermal energy in the U.S. It has been producing power since 1969. Exploration efforts are also underway in the Imperial Valley, Salton Sea, Mono Lake, and Modoc County, California.

Between 1970 and 1980 geothermal production increased from 525 to 5,073 million kilowatt hours, and installed generating capacity increased from 84 to 1,005 kilowatts. Geothermal energy presently accounts for less than 1 percent of total U.S. energy production.

Environmental Impact: A number of gases are associated with geothermal systems and may pose health and pollution problems. These gases include ammonia, boric acid, carbon dioxide, carbon monoxide, hydrogen sulfide, and others. However, adverse air quality impacts are generally less than those associated with fossil-fuel plants. Also associated with geothermal energy systems are saline waters which must be disposed of and isolated from contact with ground water regimes.

Land quality problems stem from disturbance due to construction of related facilities and possible ground subsidence which, in turn, can cause structural failures and loss of ground water storage capacity.

Other Energy Sources: The high cost and rapidly shrinking reserves of the traditional energy fuels have encouraged research into new and different sources for potential energy. Some of these alternate sources have been known for decades, but high costs and technical problems have prevented their widespread use. They include tidal power, wind power, organic fuels, and ocean thermal-gradients, among others. These sources are expected to account for up to 13 percent of total domestic energy consumption by 2020 (see Table 5).

Environmental impacts of these alternatives are difficult to assess, especially as a great amount of research and development remains to be completed before operational scale systems can be developed, tested, and evaluated for production and application.

The date of commercial availability of such alternatives will depend on the cost of the traditional energy fuels, the level of Federally subsidized research through ERDA assistance, and the solution of engineering and technical problems.

Combination of Alternatives: A combination of some of the most viable energy sources available to this area, discussed above, could be utilized to attain an energy equivalent comparable to that estimated to be produced within the field life anticipated by this proposed action. However, this combination of alternatives, in order to attain the needed energy mix peculiar to the infrastructure of this area, would have to consist of energy sources attainable now or within the timeframe that are transferable to the technology presently used, i.e., viable substitutes would have to be available for the petroleum

and natural gas required by the petrochemical industrial complex, the petroleum used for the transportation sector, and the electricity and fuels used in residential and commercial sectors.

Part II of the Energy Alternatives: A Comparative Analysis, particularly Chapter 16, "Comparing the Economic Costs of Energy Alternatives," discusses the factors that must be involved in developing technically and economically appropriate energy alternatives.

Tables 1, 2, and 3 display U.S. production, consumption, and net imports of energy by type, 1970-1980. The most noteworthy change in energy to occur in the 1970's was the enormous increases in the prices of fossil fuels (see Table 4).

These were caused mainly by the large increases in crude oil prices set by OPEC in 1974 (357 percent) and in 1980 (95 percent). OPEC controls the bulk of the world's oil production and can set market prices based on factors other than price/cost relationships. Increases in the prices of substitutes, gas and coal, followed.

Thus, while the amounts produced, consumed, and imported did not change drastically (although crude oil consumption and imports did rise and fall), their value did increase substantially.

Table 5 displays the Department of Energy's (1980 Annual Report to Congress) projections of domestic energy production and consumption, by type, 1985 to 2020. DOE prepared three series of projections, each a function of a distinct time path (low, medium, or high) for the price of international (imported) oil. As even the low price time series assumes (slight) real price increases (prices rising faster than the general inflation rate), Table 5 displays the low price projections, given the considerations regarding OPEC's waning price-setting strength stated previously.

The most viable domestically available energy alternatives, technologies and economies allowing, would probably consist of the use of coal, oil shale, tar sands, and biomass to produce synthetic liquids, nuclear energy, and coal to compete for the utility market, and renewables to supply a sizeable portion of total energy requirements. The environmental impacts of each of these alternatives have been discussed briefly in the previous sections. The result will be a long-term energy supply transition from crude oil and less dependence on oil imports. Such patterns will require new efficient technologies, major capital investments, and a high rate of growth in coal production.

The future U.S. energy source mix will depend on a multiplicity of factors, among them the identification of resources, research and development efforts, development of technology, rate of economic growth, the economic climate, changes in lifestyle and priorities, capital investment decisions, energy prices, world oil prices, environmental quality priorities, government policies, and availability of imports.

It is unlikely that there will ever be a single definitive choice between energy sources, or that development of one source will preclude development of others. Different energy sources will differ in their rate of development and the extent of their contribution to total U.S. energy supplies. Understanding

of the extent to which they may replace or complement offshore oil and gas requires reference to the total national energy picture. Relevant factors are:

Historical relationships indicate that energy requirements will grow in proportion to the gross national product.

Energy requirements can be constrained to some degree through the price mechanisms in a free market or by more direct constraints. One important type of direct constraint operating to reduce energy requirements is through the substitution of capital investment in lieu of energy, e.g., insulation to save fuel. Other potentials for lower energy use have more far-reaching impacts and may be long range in their implementation--they include rationing, altered transportation modes, and major changes in living conditions and lifestyles. Even severe constraints on energy use can be expected to only slow, not halt, the growth in energy requirements within the timeframe of this statement.

Energy sources are not completely interchangeable. For example, solid fuels cannot be used directly in internal combustion engines. Fuel conversion potentials are severely limited in the short term, although somewhat greater flexibility exists in the longer run and generally involves choices in energy-consuming capital goods.

The principal competitive interface between fuels is in electric power plants. Moreover, the full range of flexibility in energy use is limited by environmental considerations.

Regulation of oil and gas prices lowered the price below the product level that refiners (and consumers) paid for domestic oil, and prevented the incremental cost of all domestic producing fields from equating to the price of imports. This impaired the economy's ability to adjust to world energy prices: underproduction of domestic oil, overconsumption of imports, and impediments to alternative energy. Under deregulation the real prices of oil and gas will be closer to the marginal costs of alternative energy.

A broad spectrum of research and development is being directed to energy conversion--more efficient nuclear reactors, coal gasification and liquefaction, liquefied natural gas (LNG), and shale retorting, among others. Several of these could assume important roles in supplying future energy requirements, though their future competitive relationship is not yet predictable.

Table 1
U.S. Net Imports of Energy by Type,
1970-1980

Year	Coal		Crude Oil and Refined Petroleum Products[1/]		Natural Gas (Dry)		Electricity		Coal Coke		Net Imports		Imports as Percentage of Total Energy Consumed	
	Quads	Percentage Change from Previous Year	Quads	Percentage Change from Previous Year	Quads	Percentage Change from Previous Year	Quads	Percentage Change from Previous Year	Quads	Percentage Change from Previous Year	Quads	Percentage Change from Previous Year	Percentage	Percentage Change from Previous Year
1970	-2	---	7	---	1	---	0	---	0	---	6	---	9.0	---
1971	-2	0	8	14.3	1	0	0	0	0	0	7	16.7	10.3	14.4
1972	-2	0	10	25.0	1	0	0	0	0	0	9	28.6	12.5	21.4
1973	-1	100	13	30.0	1	0	0	0	0	0	13	44.4	17.3	38.4
1974	-2	-100	12	-8.3	1	0	0	0	0	0	12	-8.3	16.4	-5.5
1975	-2	0	13	8.3	1	0	0	0	0	0	12	0	16.9	3.0
1976	-2	0	15	15.4	1	0	0	0	0	0	15	25.0	20.0	18.3
1977	-1	100	18	20.0	1	0	0	0	0	0	18	20.0	23.7	18.5
1978	-1	0	17	-5.9	1	0	0	0	0	0	17	-5.9	21.8	-8.7
1979	-2	-100	17	0	1	0	0	0	0	0	17	0	21.5	-1.4
1980	-2	0	13	-30.8	1	0	0	0	0	0	12	-41.7	15.8	-36.1
Avg. Annual Growth		0%		6.4%		0%		0%		0%		7.2%		5.8%

Source: Energy Information Administration.

1/ Includes crude oil, lease condensate, imports of crude oil for the Strategic Petroleum Reserve, refined petroleum products, unfininshed oils, natural gasoline, and plant condensate.

Table 2

U.S. Consumption of Energy by Type
1970-1980

	Coal			Natural Gas (Dry)			Petroleum			Hydroelectric Power[1/]		
Year	Quads	Percent of Total Consumption	Percentage Change from Previous Year	Quads	Percent of Total Consumption	Percentage Change from Previous Year	Quads	Percent of Total Consumption	Percentage Change from Previous Year	Quads	Percent of Total Consumption	Percentage Change from Previous Year
1970	13	19	---	22	33	---	30	45	---	3	4	---
1971	12	18	-8.3	22	32	0	31	46	3.3	3	4	0
1972	12	17	0	23	32	4.5	33	46	6.5	3	4	0
1973	13	17	8.3	23	31	0	35	47	6.1	3	4	0
1974	13	18	0	22	30	-4.5	33	45	-6.1	3	4	0
1975	13	18	0	20	28	-10.0	33	46	0	3	4	0
1976	14	19	7.7	20	27	0	35	47	6.1	3	4	0
1977	14	18	0	20	26	0	37	49	5.7	3	4	0
1978	14	18	0	20	26	0	38	49	2.7	3	4	0
1979	15	19	7.1	21	27	5.0	37	47	-5.7	3	4	0
1980	16	21	6.7	20	26	-5.0	34	45	-8.8	3	4	0
Avg. Annual Growth			2.1%			-1.0%			1.3%			0%

Table 2
U..8. Consumption of Energy by Type
1970-1980
(cont.)

Year	Nuclear Electric Power			Other[2/]			Total Energy Consumed	
	Quads	Percent of Total Consumption	Percentage Change from Previous Year	Quads	Percent of Total Consumption	Percentage Change from Previous Year	Quads	Percentage Change from Previous Year
1970	0	0	---	0	0	---	67	---
1971	0	0	0	0	0	0	68	1.5
1972	1	1	---	0	0	0	72	5.9
1973	1	1	0	0	0	0	75	4.2
1974	1	1	0	0	0	0	73	-2.7
1975	2	3	100	0	0	0	71	-2.8
1976	2	3	0	0	0	0	75	5.6
1977	3	4	50	0	0	0	76	1.3
1978	3	4	0	0	0	0	78	2.6
1979	3	4	0	0	0	0	79	1.3
1980	3	4	0	0	0	0	76	-3.9
Avg. Annual Growth			14.7%			0%		1.3%

Source: Energy Information Administration

1/ Includes industrial and utility production, and net imports of electricity.
2/ Includes geothermal power, electricity produced from wood and waste, and net imports of coal coke.

Table 3

U.S. Production of Energy by Type
1970-1980

Year	Coal			Crude Oil[1/]			NGPL[2/]			Natural Gas (Dry)		
	Quads	Percent of Total Production	Percentage Change from Previous Year	Quads	Percent of Total Production	Percentage Change from Previous Year	Quads	Percent of Total Production	Percentage Change from Previous Year	Quads	Percent of Total Production	Percentage Change from Previous Year
1970	15	24	---	20	32	---	3	5	---	22	35	---
1971	14	23	-7.1	20	32	0	3	5	0	22	35	0
1972	14	22	0	20	32	0	3	5	0	22	35	0
1973	14	23	0	19	31	-5.3	3	5	0	22	35	0
1974	14	23	0	19	31	0	2	3	-50	21	34	-4.8
1975	15	25	7.1	18	30	-5.6	2	3	0	20	33	-5.0
1976	16	27	6.7	17	28	-5.9	2	3	0	19	32	-5.3
1977	16	27	0	17	28	0	2	3	0	20	33	5.3
1978	15	25	-6.7	18	30	5.9	2	3	0	19	31	-5.3
1979	18	28	20.0	18	28	0	2	3	0	20	31	5.3
1980	19	29	5.6	18	28	0	2	3	0	20	31	0
Avg. Annual Growth			2.4%			1.1%			-4.1%			-1.0%

Table 3
U.S. Production of Energy by Type
1970-1980
(cont.)

Year	Hydroelectric Power[3/] Quads	Hydroelectric Power[3/] Percent of Total Production	Hydroelectric Power[3/] Percentage Change from Previous Year	Nuclear Electric Power Quads	Nuclear Electric Power Percent of Total Production	Nuclear Electric Power Percentage Change from Previous Year	Other[4/] Quads	Other[4/] Percent of Total Production	Other[4/] Percentage Change from Previous Year	Total Energy Produced Quads	Total Energy Produced Percentage Change from Previous Year
1970	3	5	---	0	0	---	0	0	---	63	---
1971	3	5	0	0	0	0	0	0	0	62	-1.6
1972	3	5	0	1	2	0	0	0	0	62	-1.6
1973	3	5	0	1	2	0	0	0	0	62	-1.6
1974	3	5	0	1	2	0	0	0	0	62	-1.6
1975	3	5	0	2	3	100	0	0	0	61	-1.6
1976	3	5	0	2	3	0	0	0	0	60	-1.7
1977	2	3	0	3	5	50	0	0	0	60	0
1978	3	5	0	3	5	0	0	0	0	61	1.6
1979	3	5	0	3	5	0	0	0	0	64	4.9
1980	3	5	0	3	5	0	0	0	0	65	1.6
Avg. Annual Growth			0%			14.7%			0%		0.3%

Source: Energy Information Administration.

1/ Includes lease condensate.
2/ Natural gas plant liquids.
3/ Includes industrial and utility production of hydropower.
4/ Includes geothermal power and electricity produced from wood and waste.

Table 4
Prices of Domestically Produced Fossil Fuels
(Cents[1/] Per Million BTU's)

	1970	1980	Avg. Ann. Increase	1960-1970 Avg. Ann. Increase
Crude Oil	59.9	206.0	13.1%	-1.6%
Natural Gas	16.9	76.9	16.4%	-0.5%
Coal[2/]	27.9	64.9	8.8%	-1.5%

Source: Energy Information Administration.

1/ Constant 1972 dollars.
2/ Bituminous coal and lignite.

Table 5
Projected U.S. Energy Production and Consumption, by Type
1985-2020
Low Oil Price Scenario

	1985		1990		1995		2000	
	Quads	Percentage of Total Consumption	Quads	Percentage of Total Consumption	Quads	Percentage of Total Consumption	Quads	Percentage of Total Consumption
Domestic Energy Supply								
Liquid Fuels								
Conventional Crude Oil[1/]	17.8	22.3	16.7	18.7	16.5	16.7	16.1	15.1
Enhanced Recovery	1.2	1.5	2.0	2.2	2.9	2.9	3.3	3.1
Shale Oil and Tar Sands	.0	.0	0.1	0.1	0.5	0.5	1.0	0.9
Synthetic (from coal)	.0	.0	.0	.0	.0	.0	1.4	1.3
Liquids from Biomass	.0	.0	.0	.0	.0	.0	0.3	0.3
Total	19.0	23.8	18.8	21.1	19.9	20.2	22.1	20.7
Gaseous Fuels								
Conventional Natural Gas	17.1	21.4	16.1	16.1	15.9	16.1	11.3	10.6
Enhanced Recovery	.0	.0	.0	.0	.0	.0	5.6	5.3
Synthetic (from coal)	.0	.0	.0	.0	.0	.0	0.2	0.2
Total	17.1	21.4	16.1	18.0	15.9	16.1	17.1	16.0
Coal[2/]	22.8	28.5	30.3	33.9	37.9	38.4	38.0	35.6
Nuclear	5.6	7.0	8.0	9.0	9.1	9.2	11.1	10.4
Other[3/]	3.4	4.3	3.6	4.0	4.1	4.2	10.2	10.0
Total Domestic Production	67.9	85.0	76.8	86.0	86.9	88.0	98.6	92.6
Imports								
Net Oil Imports	12.7	15.9	14.1	15.8	14.1	14.3	10.6	9.9
Net Gas Imports	1.5	1.9	1.1	1.2	1.3	1.3	1.0	0.9
Net Coal Imports	-2.2	---	-2.7	---	-3.6	---	-3.7	---
Total Net Imports	12.0	15.0	12.5	14.0	11.8	12.0	7.9	7.4
Total Consumption	79.9	100.0	89.3	100.0	98.7	100.0	106.6	100.0

1/ Includes NGPL.
2/ Does not include coal used for synthetic oil and gas.
3/ Includes hydroelectric, geothermal, solar, wind, and biomass. Does not include liquids from biomass.

Source: Energy Information Administration.

Table 5
Projected U.S. Energy Production and Consumption, by Type
1985-2020
Low Oil Price Scenario (continued)

	2010		2020		Avg. Ann. Growth 1985-2000 (Percentage)	Avg. Ann. Growth 2000-2020 (Percentage)
	Quads	Percentage of Total Consumption	Quads	Percentage of Total Consumption		
Domestic Energy Supply						
Liquid Fuels						
Conventional Crude Oil[1/]	12.5	10.1	7.9	5.6	-0.7	-3.6
Enhanced Recovery	3.7	3.0	3.0	2.1	7.0	-0.5
Shale Oil and Tar Sands	2.2	1.8	3.1	2.2	16.6	5.8
Synthetic (from coal)	6.8	5.5	14.8	10.4	---	12.5
Liquids from Biomass	0.5	0.4	0.8	0.6	---	5.0
Total	25.7	20.9	29.6	20.8	1.0	1.5
Gaseous Fuels						
Conventional Natural Gas	8.7	7.1	6.3	4.4	-2.8	-3.0
Enhanced Recovery	7.0	5.7	7.6	5.3	---	1.5
Synthetic (from coal)	0.7	0.6	1.3	0.9	---	9.8
Total	16.4	13.3	15.2	10.7	.0	-0.6
Coal[2/]	47.7	38.7	59.5	41.8	3.5	2.3
Nuclear	16.3	13.2	19.1	13.4	4.7	2.8
Other[3/]	13.5	11.0	18.4	12.9	7.6	3.0
Total Domestic Production	119.6	97.1	141.7	99.6	2.5	1.8
Imports						
Net Oil Imports	6.9	5.6	4.3	3.0	-1.2	-4.6
Net Gas Imports	0.4	0.3	0.1	0.1	-2.7	-12.2
Net Coal Imports	-3.8	---	-3.9	---	-3.5	-0.3
Total Net Imports	3.5	2.9	0.5	0.4	-2.8	-14.8
Total Consumption	123.2	100.0	142.3	100.0	1.9	1.5

1/ Includes NGPL.
2/ Does not include coal used for synthetic oil and gas.
3/ Includes hydroelectric, geothermal, solar, wind, and biomass. Does not include liquids from biomass.

Source: Energy Information Administration.

APPENDIX 6

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Jim Sullivan	Economist
Evert Tornfelt	Social Science Analyst
John Tremont	Environmental Protection Specialist
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Bob Weinhold	Fishery Biologist
George Allen	Regional Planner
Nancy Swanton	Environmental Protection Specialist
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Appendix 7

Exploratory and Operational Technology

in

The Arctic

1. Exploratory and Operational Technology in the Arctic

The Soviet Union borders on 52 percent of the Arctic Ocean and controls approximately 70 percent of the Arctic continental shelf. The Soviets have yet to explore offshore· however, onshore discoveries found near the Arctic Circle are being vigorously developed. The first major resource developed by the Russians was natural gas. The reserve is located 2,000 miles west of the Bering Strait, and supplies Takutsk, a city of approximately 85,000 people, located in eastern Siberia. The original pipelines supplying Yakutsk trasversed above the permafrost and as a result numerous breaks in service occurred due to thermal expansion of the gas. A new large-diameter line, buried to a depth of approximately 5 feet, and transporting refrigerated gas, is expected to solve the thermal expansion problems.

West of the Yakutsk supply area, approximately 1,600 miles in the Tyumen Province of western Siberia, the Soviet Union has discovered a number of huge anticlinal gas reservoirs. This cluster of fields contains reserves totalling roughly 25 times as much as the gas in the Prudhoe Bay field. The world's largest gas field, Urengio, with probable reserves of nearly 180 trillion cubic feet, is located here. These fields are drilled by directional gas wells in clusters of six to eight, and the collected gases are processed at the fields for removal of moisture and heavier hydrocarbons, then compressed, refrigerated, and pipelined to distant markets. About half of the gases contain condensate; none have hydrogen sulfide. Towns accommodating 10,000 people have recently been built to house personnel to operate the fields and process plants. Pipe has been airlifted in. The pipelines are buried in permafrost for approximately the first 150 miles. The pipe laying process has had to overcome such obstacles as the cold climate, seasonal darkness, swamps, rivers, and permafrost. Several pipelines with a maximum diameter of 56 inches, extending for 2,500 miles, and operating at up to 1,400 psi are presently operational. Additional lines with similar specifications are presently under construction. A single line with the aforementioned specifications can handle up to 2.3 billion cubic feet of gas daily compared to teh 2.0 to 2.4 BCDF design for the Prudhoe Bay gas.

Finland, Sweden, and Norway have had no exploratory work at these northern latitude. In the North Sea, 62° North latitude, has been the northernly limit to date for the exploration and production. Oil is the dominant resource in that region.

The next area, located west of Greenland, between Greenland and Canada, is a narrow extension of the Davis Strait. In this region two wells have been drilled using drillships with quick-disconnect drill systems to permit movement of the ships in order to avoid icebergs. Iceberg keel tracts 30 feet deep have been observed in waters as deep as 1,000 feet in this area. One of the two wells was drilled in 540 feet of water to a total depth of 10,500 feet, and the other was drilled in 1,470 feet of water to a total depth of 11,870. The later contained gas.

In the Canadian Arctic Islands further west, a great deal of exploratory effort has been expended in the last decade onshore and more recently offshore. Through 1976, 115 wells were drilled. Exploratory work is actively continuing. Discoveries to date include one onshore oilfields, the Bent Horn which is economically marginal at perhaps 250 million barrels of recoverable reserves, plus seven major gas fields, each with at least one trillion cubic feet of gas and a total of about 14 TCF. One of these fields, Drake, may have 4.5 TCF. These gas fields were discovered onshore and others have subsequently been discovered offshore. Onshore drilling has been generally of standard technology for the conditions at these latitudes. Supplies are brought in by barge and icebreaker on the Mackenzie River from Eastern Canada during the short summer season. During the rest of the year there is heavy reliance on Hercules aircraft for freight shipments and on Twin Otter or similar lighter aircraft for personnel movement. Helicopters have been employed on short hauls.

Resolute, located on Cornwallis Island, was an early forward base for supplies, however exploratory successes have been occurring farther northwest on Cameron, Ellef Ringnes, and especially Melville Islands. As a result the supply route has shifted directly to sub-bases on those islands. Some of the wells on these islands have had oil shows. There are indications of tar sands, but the area so far appears to be strongly gas prone. The structures tend to be less than 20 percent filled with gas, and oil of the gas fields appears to be of the same geologic age. Depth is generally less than 10,000 feet deep. The gas is nearly pure methane. Bent Horn oil was found at about 10,700 feet depth, on Cameron Island, and was 47 API.

The offshore gas exploratory technology has been particularly noteworthy. Wells have been drilled on top of the ice pack in waters as deep as 1,100 feet, as much as 51 miles from shore, and with a drilling rig capable of going to an exploratory offshore depth of 10,000 feet. The first ice platform well was the Jackson Bay G-16A, 4 miles off Ellef Ringnes Island in 200 feet of water, with it, an extension to a major gas field was found, at a depth of 4,600 feet, in early 1976. Several other ice platform wells have been successful, and perhaps the most interesting and most completely documented was the Drake F-76 . This well, a $21 million project, was drilled to 3,720 feet total depth, in 200 feet of water one mile off the east coast of the Sabine Peninsula of Melville Island. The rig was especially designed for subsea completions, and it worked

successfully with the resulting gas piped ashore under water and ice from a wet Christmas tree wellhead diverless hookup to an 18-inch flowline bundle. The flowline is trenched and refrigerated at water depths of 60 feet and less, onto shore where flow testing equipment has been employed. The trenching, the gravel pipeline cover, and refrigeration of the flowline provides protection from ice scouring. Methanol injection in the gas well prevents hydrate problems. This design is considered adequate for subsea diverless completions in water deep as 1,500 feet. The ice at the wellsite was 7 feet thick, prior to being artifically thickened in winter to 23 feet, and wooden beams and insulation formed the foundation for the rig. The rig was designed to compensate for up to 15 feet of ice platforms horizontal movement, but the ice proved to be quite stable. That tends to be the case for surface ice in winter among these islands. No production operations have as yet occurred in this area, but studies of marketing technologies and economics are continuing. Panarctic expects oil production by 1986 or 1987.

Further west in Canada is the Mackenzie River Delta located in the Beaufort Sea. In this region, Dome Petroleum Ltd., is using four ice-strengthened drill ships in waters ranging from 60 to 224 feet deep. By 1981, Dome had completed the drilling of 17 test wells. The technique has been substantially improved since first being employed and has resulted in extending the drilling season from 60 days in 1976 to almost 150 days in 1981. Gulf Canada Resources, Inc., expects to have drilling units in the Beaufort Sea in 1983 which are capable of operating safely for 6 months per year. One of its vessels will have a design capability for operating year round, if necessary.

The total cost through 1978 of three of these drillships and associated supply equipment, plus a forward base located at Tuktoyaktuk was approximately $250 million. The operations resulted in three significant discoveries.

One of the operational problems is that of dealing with subsea permafrost. This condition is encountered approximately 100 miles from shore at a sub-surface depth of 1400 to 2000 feet. At the base of the permafrost is a layer of superpressured melt water posing a potential hazard to the intergrity of the well. The problem has been alleviated through the use of permafrost cement for a drill depth of the first 3000 feet.

Dome has found gas or oil at all of their first eight drill sites. Dome believes they can start pumping by 1985. Because the discoveries are 50 to 60 miles offshore, and, therefore, in the shear zone, the primary design problem for development operations will be the effects of moving ice. Dome plans to build a 'swivel ship' to automatically turn into the moving ice. In 1980, Dome postponed asking shipyards to bid on a swivel ship because of changing Canadian government policies and tax benefits. For the production phase, plans are to building huge artificial islands in 200 feet of water using sand covered by steel-reinforced concrete to serve as safe harbors to oil tankers. The company using miniature spills to experiment with cleanup procedures.

Reports indicate that operating costs range between $30 and $40 million per well. These reports also indicate that LNG and icebreaker tankers may be the only way to bring these resources to market. However, pipelines, as a mode of transportation southward, are presently under consideration.

In shallow and coastal waters in the Mackenzie River Delta, the primary technology has centered on artificial islands. The first artificial island was constructed in 1973. Over 20 such islands have been constructed in water depths ranging from 3 to 62 feet. None of these islands have been adversely affected by ice, no shearing failures have occurred, and no ice override has been experienced. Gravel and sand, with sandbagged shores, have been the principal construction materials, and the surface area when finished has typically been 250 feet by 400 feet, with 10 feet of freeboard on top of which the rig flooring is placed. One island was built from two sunken river barges surrounded by pumped-in silt and sand, with a sandbag berm surrounding the entire island as the final protection from surface ice pressures. Production islands will have to be larger, 600 to 1,000 feet in diameter, and are planned to be 15 feet above water level. Dome constructed a concrete caisson artificial production island in 1981. Dome estimates that 30 wells can be directionally drilled from a single island to cover a 5-mile radius. Development islands would be designed to have a shear resistance 10 times that which the largest ice forces could impose on the islands.

The typical construction method is to use a dredging barge, with a silt remover, to get to gravel, and sand and (preferably) not more than 10 percent by weight of silt. The barge has a suction system and a pump which pumps the slurry through a floating larger-diameter flexible tube to the proposed drillsite. The end of the flexible tube is held in position by two sunken tugs. One island requiring 2.1 million cubic yards of slurry was built in 88 days using this system.

Gravel, the very important artificial island construction material, is reported to be "ubiquitous" offshore in the Arctic region, but may lie under the silt layer which in places in 30 feet thick.

In deeper waters, 40 to 130 feet, an alternative design using a caisson metal 11 as a slurry retainer, with the caisson being re-usable, appears to be competitive, but to date this design has not been put into actual practice. Another 100 to 500 feet deep, is a conical steel structure for retaining or resting on some gravel fill; this monocone design has sidewalls which allow ice to move up and then curve backwards for brakage.

Tides are 1.5 feet high and, except for occasional quick short storms. The waves are mild. The centennial (100 year) wave is estimated to be 25 feet high. In ice-free waters this area would be suitable to submersibles, jackups, and drilling barges. Supply logistics are similar to those described for the drillship area. Drilling on these islands can occur year-round. The islands have reportedly cost $2 to $15 million each, depending on gravel source, location and water depth.

The principal operating companies in northern Canadian waters are: Panarctic in the Islands, Dome from drillships, and ESSO and Dome from artificial islands.

winds of a few knots rise to gale force in minutes. These winds have whipped waves to heights of at least 11 or 12 feet, breaching, in one instance, one of the causeways at Prudhoe. Warnings of such storms have been difficult to obtain in a timely manner.

Ice in the area is a complex subject. The open water season along the coast lasts usually about 2 months in late summer. Ice forming along the shoreline may hold water with as much as 50 percent salinity. In mid to late winter, the smooth ice out to the barrier islands may have a thickness of about 2.5 feet, and is usually relatively stable. Fast ice beyond the barrier islands may, in the late winter, experience a thermal expansion of 3 feet or more, moving outward from shore. Beyond the fast ice is the shear zone of grounded ice ridges where scouring of the bottom occurs. Farther out is the ice pack, moving westerly parallel to shore at a rate of 1.2 to 1.5 miles per day. In late spring or early summer ice thawing on the seawater surface, plus rivers pouring out fresh water over the ice area, cause a complex salinity pattern.

Prudhoe Bay permafrost extends to an estimated depth about 1,850 feet. Its occurrence offshore, as to depth and extent is not well known except for some areas closer to shore. Test holes indicate that permafrost declines rapidly from surface to 70 feet and more when seawater appears under the shore-fast ice. Bonded permafrost may be at a depth of 300 feet, and a distance of 8.5 miles offshore. The data are limited. Drilling onshore in permafrost requires 5 feet of gravel in order to provide necessary insulation.

Exploratory efforts along the coast widened appreciably when a well was successful in a non-Prudhoe reservoir 55 miles east of Prudhoe. It is possible that this success will result in eventual construction of a satellite enclave of equipment and personnel at that location. Two follow-up wells have been moderately encouraging.

Several wells elsewhere along the coast have been drilled directionally to the offshore, and artificial islands of gravel have also been employed. One novel technique not used elsewhere has been the grounded ice island or platform. Union built a one-season ice island, and Exxon is experimenting with a multi-seasonal ice island protected by insulation during the summer seasons. Union's well went to 9,809 feet total depth.

3. Diapir Field Planning Area

Technology applied in this planning area will use parts or all of the technologies which have been successful elsewhere in similar climates and waters.

The basic exploratory platform will be an artificial island grounded to the seafloor. The island may be of gravel and sand, or gravel with caisson, or a sunken drilling barge capable of being refloated, or a thickened ice island. If drilling is permitted from the barrier islands, those islands will form the base of a platform built by gravel to 10 feet of freeboard. A few directionally-drilled exploratory wells will be sited onshore; probably less than 5 percent of the sale area can be explored adequately with this method. Grounded ice islands have many advantages in shallow waters if they can be kept frozen from year to year.

Permanent production platforms will probably be enlarged gravel islands. Pipelines to shore will likely enter a gravel-built causeway as protection from ice scour. All islands will require protective berms, caissons, sandbags, or pilings, especially to resist ice movement westward and seasonally away from shore.

New technology which may favorably affect drilling in this area, as well as other places around the globe, include measurement-while-drilling (MWD), chainbelt drills, downhole motors, and advances in drilling rig designs. It is reported that an international oil company has committed for a Class 7+ icebreaker in a Helsinki, Finland shipyard and it also is reported that a Canadian oil company is designing a large hovercraft for use as a highly portable exploratory drilling platform. MWD is perhaps currently of the greatest interest in the oil industry; it will provide a wide variety of instant information regarding the working status at the drill bit.

Appendix 8

Completed and Ongoing Studies Being

Carried Out by the

OCS Environmental Studies Program

COMPLETED STUDIES

Appendix

The following is a list of all studies which have been completed since the beginning of the program, and are currently underway.

OCS-Wide

Hydrocarbon Quality Control Analysis, FY '78
Assessment of Space and Use Conflicts

Mid-Atlantic

Baltimore Canyon Trough Benthic Survey Study (1978)
Middle Atlantic Bight Ichthyoplankton Study (1980)
Diseases of North American Marine Fish and Shellfishes (1980)
Chemical and Biological Benchmark Studies - First Year
Chemical and Biological Benchmark Studies - Second Year
Benthic Recolonization Study
Mid-Atlantic Geologic Studies - First Year
Mid-Atlantic Geologic Studies - Second Year
Mid-Atlantic Geologic Studies - Third Year
Mid-Atlantic Physical Oceanographic and Meteorological Study (1977)

North Atlantic

Tamano Oil Spill Study (1975)
Georges Bank Conference - Marine Environmental Assessment (1975)
Georges Bank Climatological and Oceanographic Analysis (1980)
North Atlantic Geological Studies - First Year
North Atlantic Geological Studies - Second Year
EG&G New England Physical Oceanography - First Year
EG&G New England Physical Oceanography - Second Year
Raytheon New England Physical Oceanography - First Year
Raytheon New England Physical Oceanography - Second Year
New England Outer Continental Shelf Environmental Benchmark Study (1978)

North and Mid-Atlantic

Continental Slope Environmental Information Summary - Canadian/U.S. Border to Cape Hatteras, N.C. (1976)
Summary and Analysis of Environemntal Information on the Continental Shelf (1977)
Cultural Resource Information - Summary and Analysis (1979)
Three North and Mid-Atlantic Canyons Assessment Study (1981)
Meteorological Buoy Monitory Network

South Atlantic

South Atlantic OCS Geological Studies, FY'78
South Atlantic OCS Physical Oceanographic Modeling - Phase I
South Atlantic OCS Data Buoy, FY'78-'81
South Atlantic Cultural Resources Evaluation Study
South Atlantic OCS Geological Studies, FY'79
South Atlantic OCS Studies Conference
South Atlantic OCS Benchmark Study FY'77
Couth Atlantic OCS Physical Oceanography Literature Synthesis, FY'77
South Atlantic OCS Physical Oceanography
South Atlantic OCS Siterature Synthesis
South Atlantic Hard Bottom Study
South Atlantic OCS Physical Oceanography, Year II
South Atlantic Data Buoy Monitoring Newwork
South Atlantic OCS Satellite Oceanography
South Atlantic OCS Physical Oceanography Data Collection
South Atlantic OCS Geological Studies/Georgia Embayment Region
South Atlantic OCS Geological Studies, FY'78

Gulf of Mexico

Eastern Gulf of Mexico Marine Habitat Mapping Study
Gulf of Mexico Topographic Features Study
South Texas OCS Three Year Data Synthesis
South Texas OCS Fisheries Investization Study
Mapping of Seagrasses by Remote Sensing in the Eastern Gulf of Mexico
Sout Texas OCS Geological Investigations, FY'76
Texas OCS Geological Investigation, FY'77

Pacific Coast

California Coastal Recreation and Asthetics Study
Southern California Summary of Knowledge
Southern California Marine Mammal and Seabird Survey, Year I
Southern California Bight Baseline, Year I
Summary and Analysis of Environmental Information of the Oregon and Washington Coastal Zone and Offshore Areas
Southern California Marine Mammal and Seabird Study, Year II
Summary of Knowledge of Central and Northern California Coastal Zone and Offshore Areas
Southern California Bight Air Quality Modeling - Literature Survey
Southern California Bight Archaeolgical Literature Survey and Sensitivity Zone Mapping

Southern California Marine Mammal and Seabird Survey, Year III
Barium and Vanadium Methodology
Biological and Geological Reconnaissance and Characterization Survey of the Tanner Cortez Banks
Air Quality Analysis in Relation to Potential OCS Oil and Gas Development off Central and Northern California
Environmetnal Geology of Selected Areas of the Southern California Continental Boderland
Northern California/Southern Oregon Geological Hazards and Structure
Erosion and Transport of Sediments and Pollutants on the San Pedro Shelf, Southern California
Seabird Nesting and Seasonal Use: Central and Northern California

Alaska

A Cenus of Seabirds on the Pribiloff Islands
Analysis of Marine Mammal Remote Sensing Data
Microbird Communities in the Lower Cook Inlet
Study of the Littoral Zone of the Kenai Peninsula
Razor Clam Sensity and Distribution
Benthos of Yakutat Bay
Inshore Distribution and Abundance of Larval Juvenile and Forage Fish Species
Identification Documentation and Delineation of Coastal Migratory Bird Habitats
Bristol Bay Oceanographic Processess
Abundance and Seasonal Distribution of Bowhead and Belukha Whales
Physiological Impact of Oil on Pinnipeds
Identification of Major Processes in Biotrans Formation of Petroleum Hydrocarbons and Trace Metals
Assessment of Available Literature on the Effects of Oil Pollution on Biota in Arctic and Subartic Waters
Ecosystem Dynamic Modeling - Eastern Bering Sea
Baseline Characterization of Litteral Biota -Bering Sea
Baseline Characterization of Litteral Biota in the gulf of Alaska and Bering Sea
Intermediate Seal Circulation Patterns for Gulf of Alaska, Kodiak and Lower Cook Inlet
Beaufort Shelf Surface Currents
Remote Sensing of Time Dependent Sea-Ice Distribution
Effects of Petroleum on Reproductive Success of Seagulls
Dynamics of Nearshore Sea-Ice
Environmental Geology and Geomorphology of the gulf of Alaska Coastal Plain
Seasonal Variations in Streamflow and Suspended Particulate Matter of Alaskan Coastal Streams
Acute Toxicity of Petroleum to Pacific Herring Roe
The Relationships of Marine Mammal Distribution, Density, and Activities to Sea Ice Conditions
The Study of Climatic Effects on Fast Ice Extent and Seasonal Decay Along Beaufort Sea Coast
Population Assessment, Ecology and Trophic Relationships of Stellar Sealion

Distribution and Abundance of Sea Otters - S.W. Bristol Bay
Ecology and Behavior of Southern Hemisphere Sherewaters and Other Seabirds
Hydrodynamic Numerical Modeling for the Gulf of Alaska
Beaufort Sea Estuarine Fisheries Study
An Aerial Census of Spotted Seals
Biology of the Harbon Seal - Gulf of Alaska
Surface Current Measurements - Gulf of Alaska
Faulting and Instability of Shelf Sediments - Gulf of Alaska
Marine Bird Utilization of the Offshore Island Area Near Prudoe Bay
Faulting and Slope Instability in the St. George Basin
Morbidity and Mortabity of Marine Mammals
Acute and Chronic Toxicity of Petroleum to Zoea of Dungeness Crab
Distribution and Abundance of Commercial fish Shellfish and Other Epibentic Organisms
Literature Summary of Published and Unpublished Data on Distribution, Abundance, and Productivity of Demersal Finfish and Shellfish
Baseline Characterization of Trace Metals in Alaskan Waters
The Distribution, Composition, Transport and Hydrocarbon Absorbtion Characteristics of Suspended Matter in the Gulf of Alaska and Lower Cook Inlet
Salinity, Temperature and Depth Measurements on the Beaufort Sea Shelf
Historical and Statistical Physical Oceanographic Data Analysis
Sublethal Effects on Seagrasses and Photosynthesis
Grain Size Analyses of Sediments from Alaskan Continental Shelf
Mesoscale Currents and Water MAsses in Gulf of Alaska
Preparation of Issustrated Keys to Skeletal Remains and Otoliths of Forage Fishes
Trophic Relationships in the Benthic and Dermersal Fishes of the gulf of Alaska and Bering Sea
Distribution, Abundance Diversity and Production of Benthic Organisims in the Gulf of Alaska
Microbial Release of Soluble Trace Metals from Oil Impacted Sediments
National Distributions and Dynamics of Hydrocarbons on the Alaskan OCS
A Baseline Study of Historic Ice Conditions in the Arctic Ocean
Experimental Measurements of Sea-ice Failure Stresses Near Grounded Structures
Morphology of Nearshore Ice Conditoins by Means of Remote Sensing
Origin of Pressure Ridges Shear Ridges and Hummock Fields in Landfast Ice
Description and Numerical Model of Primary Production in the Gulf of Alaska
The Physicological Effect of Acute and Chronic Exposure to Hydrocarbons on Coastal Fish
Review of Literature and Archive Data for Non-Salmonid Pelagic Fishes
Baseline Characterization of Marine Mammals
Summarization of Existing Literature and Unpublished Data on the Distribution, Abundance and Life Histories of Benthic Organisim

ONGOING OR RECENTLY COMPLETED

OCS Wide

Oil Spill Probability Projection

Discussion of Technical Aspects of HArris Model
Harris Model - Analysis of Potential Economic, Demographic and Fiscal Effects of OCS Lease Sales
Review and Assessment of Fates and Effects of Drilling Muds and Cuttings in the Marine Environment
Development of Transportation Methodology (Pipelines)
Distribution and Rates of Biogenic and Petroleum Derived Substances From Sediments
Assessments of the Effects of Oil and Gas Development in the Offshore Texas and Louisiana Marine Ecosystems

Atlantic Coast

South Atlantic Physical Oceanography Study
Blake Plateau Bottom and Mid-Water Current Study
Canyon and Slope Processes Study: North and Mid-Atlantic
Study of the Economic Cost from Oil Spills to Commercial Fishing (North and Mid-Atlantic OCS)
South Atlantic Living Marine Resources Study
South Atlantic Physical Oceanography Study
Third Informal Workshop: Oceanography of Gulf of Maine and Adjacent Sea
Blake Plateau, Bottom and Mid Water Current Study
Interpretation of Physical Conditions and Their Application to Pollutant Transfer and Biological Resource Modeling
North Carolina Fisheries and environmental Data Search and Synthesis Study
Analysis of Historical Benthic Infaunal Samples from Georges Bank
Benchmark Studies Mid-Atlantic OCS
Summary and Analysis of Cultural Resources on the OCS from the Bay of Fundy to Cape Hatteras
South Atlantic OCS Physical Oceanographic Modeling Evaluation
South Atlantic Cultural Resources Evaluation Study
Characterization of Marine Mammals and Turtles in Mid and North Atlantic OCS
Crude Oil Effects to Developmental Stages of the American Lobster
Assessment of Space and Use Conflicts Between the fishing and Oil Industries
South Atlantic OCS Living Marine Resources Study
Study of the Effects of Oil on Marine Mammals
South Atlantic OCS Circulation Model
OCS Oil and Gas Operations: Possible Effects on Cetaceans
South Atlantic Blake Plateau Hazards Mapping Study
Geohazards: North and Mid-Atlantic
Meterorological Monitoring Buoy Network for the Atlantic OCS
North and Mid-Atlantic Geohazards Study
South Atlantic OCS Geological Studies, FY'79

Guld of Mexico

Northern Gulf of Mexico Topographic Feature Study
Southwest Florida Shelf Ecosystem Study
Economic Impact of Oil Spills on the Texas Coast, FY'80
IXTOC Oil Spill Damage Assessment Study

West Florida Shelf Circulation Modeling Study
Ecological Communities of OCS Slope and Adjacent Regimes of Northern Gulf of Mexico
Ecological Investigations of Petroleum Production Platforms in Central Gulf of Mexico
Eastern Gulf of Mexico Habitat Mapping Study
Gulf of Mexico Polychaeta Standardization Study
Guld of Mexico Effects of OCS Oil Gas Activities on Reef Fish
Gulf of Mexico OCS Satellite Oceanography
A Marine Recreational Fishery Statistics Survey -Gulf of Mexico
Gulf of Mexico Geological Study
Distributation and Abundance of Endangered and Vulnerable Mammals, Birds, and Turtles
Culg of Mexico OCS Geological Investigations Study
Northeastern Gulf of Mexico Coastal Ecological Characterization
Gulf of Mexico and South Atlantic OCS Study on the Distributiuon and Abundance of Endangered and Vulnerable Mammals, Birds, and Turtles
Southwest Florida Shelf Coastal Ecological Characterization
South Atlantic and Gulf of Mexico Marine Birds Literature Synthesis and Analysis
Ecological Characterization of the Mississippi Delta Plain Region
Texas Barrier Island Ecosystem Characterization
Marine Birds, MAmmals, Turtles and Endangered Manatee - South Atlantic and Gulf of Mexico Pilot Study

Pacific Coast

Southern California Air Quality Model Validation
California Meteorological Buoy Data Analysis
Southern California Air Quality Trajectory Model Study
California Seabird Oil Spill Behavior Study
Oil Spill Risk Assessment of Coastal and Marine Habitats in Central and Northern California
California Commercial and Sports Fish Oil Toxicity Study
Seabird Oil Toxicity Study
California Shelf Physical Oceanography Circulation Model
Central California Air Quality Model Validation Study
Central and Northern California Marine Mammal and Seabird Study
Establishment and Operation of a Northern California Meteorlogical Buoy Network
Offshore Meteorological Tracer Measurements
Establishment and Operation of a West Coast Buoy Network
Central California Nearshore Current Study
Climatology and Oceanographic Analysis of the California Pacific Outer Continental Shelf Region
Southern California Shelf and Ridge Geophysical and Geological HAzards Study
Ecological Characterization of Central and Northern California Coastal Region

Alaska

Petroleum Technology Assessment for the St. George Basin, North Aleutian Shelf, and Navarin Lease Sale Areas

Tissue Analysis of Endangered Whales in the Beaufort Sea
Navarin Basin Sociocultural Systems
Western Alaska Transportation Systems
North Aleutian Shelf Sociocultural Systems
St. George and North Aleutian Shelf Commercial Fishing Industries Impacts
North Aleutian Shelf Economic and Demographic Analysis
St. George Basin Anchorage Impacts
St. George Sociocultural Systems
Western Alaska Local Socioeconomic Systems
The Possible Effects of Acoustic and Other Stimuli Associated with Oil and Gas Exploration/Development on Behavior of the Bowhead Whale
Effects of Oil on the Feeding Mechanism of the Bowhead Whale
Beaufort Sea Sociocultural Systems Update Analyses
Chukchi Sea Sociocultural systems
Isolated Industrial Facilities development for Alaska OCS Oil and Gas Activities
Establishment of Tidal Datum and Profile of Dinkum Sands
Completion of Scientific Manuscripts
Yukon Delta Sociocultural Systems Analysis
Economic Demographic and Fiscal Impacts of Alaska Petroleum Development
Sociocultural Impacts on North Aleutian Shelf
Economic Analysis of Cumulative OCS Development in the Bering Sea
Petroleum Technology Assement for Chukchi and Hope Basin Lease Sale Areas
Social Indicators for OCS Impact Monitoring
Harvest Disruption Sociocultural Impacts
Provide A Geotechnical Analysis of Arctic Gas Transportation Systems
Monitoring Movements of Whales in Adjacent OCS Lease Areas
Whale Tagging Program
Presence/Absence of Bowhead and Gray Whales in Beaufort and Norton Basins
Recreation Use Study in Alaska
Water Bird Habitab Study, Kodiak Island
Simulation Modeling of Marine Bird Population Energetics, Food Consumption, and Sensitivity to Environmental Perturbations
Yukon Delta Coastal Processes Study
Fault History of Pribilof Islands and Its Relevance to Bottom Stability in St. George Basin
The Natural History and Ecology of the Bearded Seal and the Ringed Seal
Seasonal Distribution and Abundance of Marine Birds
Population Dynamics of Marine Birds in Lower Cook Inlet
Bottom and Near-Bottom Sediment Dynamics in Lower Cook Inlet
Characterization of Coastal Habitats for Migratory Birds: Northern Bering Sea
The Environmetnal Geology and Geomorphology of the Barrier Island System from Prudhoe Bay to the Colville River
Bering-Chukchi Sea Benthic Studies
Distribution, Composition, and Variability of Western Beaufort and Northern Chukchi Bethos
A seismotectonic Analysis of the Seismic and Volcanic Hazards in the Pribilof Islands and Eastern Aleutian Islands Region of the Bering Sea
Assissment of Potential Interactions of Microorganisms and Pollutants from Petroleum Development in the Bering and Chukchi Seas
Collection and Analysis of NMFS Marine Mammal Platforms of Opportunity Program Data

Lethal and Sublethal Effects on Selected Alaskan Marine Species after Acute and Long-Term Exposure to Oil and Oil Components
Ecology of Pelagic Seabirds in Southeastern Bering SEa
The Interaction of Oil with Sea Ice
Dynamics of Nearshore Sea Ice
Current Measurements in Possible Dispersal Regions of The Beaufort and Chukchi Seas
Coastal Morphology, Sedimentation, and Oil Spill Vulnerability of the Bristol Bay Coast
Sublethal Effects of Petroleum Hydorcarbons Including Bio-Transformations as Reflected by Morphological, Chemical, Physiological, Pathological, and Behavioral Indices
Delineation and Engineering Characteristics of Permafrost Beneath the Beaufort Sea
Frontal Dynamics and Water Mass Trajectory Using Methane as a Tracter
Shorebird Dependence on Arctic Littoral Habitats
Microbial Activity and Crude Oil Microbial Interactions in Waters and Sediments of Cook Inlet
Distribution, Abundance, and Feeding Ecology of Birds Associated with Sea Ice
Offshore Permafrost Studies in Arctic Lease Areas Geologic Environment of the Ice-Covered Beaufort Sea Shelf and Coastal Regions
Geologic Environmental of the Ice-Covered Beaufort Sea Shelf and Coastal Regions
Earthquake Activity and Ground Shaking in and Along the Eastern Gulf of Alaska
Erosion, Deposition, Faulting, and Instability of Shelf Sediments: Northest Gulf of Alaska
Trophic Relationships, Habitat Use, and Winter Ecology Among Ice-Inhabiting Phocid Seals and functionally Related Marine Mammals in the Arctic
Ecology of Seabirds in the bearing Strait Region
Seismic and Volcanic Risk Studies - Western Gulf of Alaska and Bristol Bay
Subsea Permafrost: Probing, Thermal Regime and Data Analysis
In Situ Measurements of the Mechanical Properties of Sea Ice
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